Cough is an important complaint of respiratory disease and normal defense mechanism of the lungs. It helps in clearing excessive secretions, fluids, infections or foreign material from the airway. In most of the cases, cough occurs as part of a brief, self-limiting illness. However, it can become a persistent symptom in several cases. The etiology of cough is very diverse and commonly includes environmental causes (cigarette smoke, pollutants, dust mites, etc.) and several disease entities, including both respiratory and nonrespiratory causes. Postnasal drip syndrome and postinfectious cough are the most common respiratory causes of chronic cough. The objective of this article is to highlight the importance and consequences of cough and discuss the effective diagnosis and management of upper airway cough syndrome and postinfectious cough. For this article, PUBMED was searched for studies and guidelines published in the English language using the medical subject heading terms cough, causes of cough, etiology of cough, postinfectious cough, post-viral cough, upper airway cough syndrome, and postnasal drip.

Keywords: Cough, causes of cough, etiology of cough, postinfectious cough, post-viral cough, upper airway cough syndrome, postnasal drip

Cough is the most common complaint of patients who present to primary care physicians.\(^1\) It has been recently identified as the sixth common reason for hospital outpatient department visits.\(^2\) In most of the cases, cough occurs as part of a brief, self-limiting illness. However, it can become a persistent symptom in several cases.\(^1\)

A cough can be arbitrarily classified as acute (that lasts for <3 weeks), subacute (that lasts between 3 and 8 weeks) and chronic (that lasts for >8 weeks). The estimated prevalence of chronic cough is between 11\(^\%\) and 20\(^\%\).\(^3\) In a survey of members of the American Academy of Allergy, Asthma and Immunology in 2008, it was observed that chronic cough was the chief complaint in about 20-40\% of new patients.\(^3\) Chronic cough occurs more often in females than males. It has been observed that women have a heightened cough reflex sensitivity compared to men.\(^4\) In most of the cases, chronic cough is dry or minimally productive in nature.\(^5\)

The etiology of cough is diverse and commonly includes environmental causes (cigarette smoke, pollutants, etc.) and several respiratory and nonrespiratory disease entities.\(^5\) The objective of this article is to highlight the importance and consequences of cough and the effective diagnosis and management of postnasal drip syndrome/upper airway cough syndrome and postinfectious cough. In preparing this article, PUBMED was searched for studies and guidelines published in the English language using the medical subject heading terms cough, causes of cough, etiology of cough, postinfectious cough, post-viral cough, upper airway cough syndrome, and postnasal drip.

**IMPORATANCE OF THE COUGH REFLEX AND COMPLICATIONS OF CHRONIC COUGH**

Cough is an important defense mechanism of the lungs. It helps in clearing excessive secretions, fluids, noxious substance or foreign material from the airway. Both excess as well as a shortfall of cough can have harmful effects on the body. While absence of cough can cause frequent aspirations leading to infection and pneumonia, an excessive cough is associated with a variety of physical and psychological complications (Table 1).\(^7,8\) This ultimately reduces the health-related quality-of-life of patients.\(^8\)

**SPECTRUM AND FREQUENCY OF ETIOLOGIES**

Chronic cough can be the key symptom of many respiratory and nonrespiratory conditions. Postnasal drip syndrome, postinfectious cough and asthma are the most common respiratory causes of chronic cough,
Table 1. Potential Complications from Excessive Cough\textsuperscript{7,8}

<table>
<thead>
<tr>
<th>System</th>
<th>Complications</th>
</tr>
</thead>
<tbody>
<tr>
<td>Central nervous system</td>
<td>Cough syncope, headache, cerebral air embolism, cerebrospinal fluid rhinorrhea, acute cervical radiculopathy, malfunctioning ventriculocatheter shunts, seizures, stroke due to vertebral artery dissection</td>
</tr>
<tr>
<td>Respiratory system</td>
<td>Pulmonary interstitial emphysema, laryngeal trauma, tracheobronchial trauma, exacerbation of asthma, intercostal lung herniation, pneumothorax, pneumomediastinum, subcutaneous emphysema</td>
</tr>
<tr>
<td>Cardiovascular system</td>
<td>Arterial hypotension, loss of consciousness, rupture of subconjunctival, nasal and anal veins, dislodgement/malfunctioning of intravascular catheters, bradyarrhythmias, tachyarrhythmias</td>
</tr>
<tr>
<td>GI system</td>
<td>Gastroesophageal reflux events, hydrothorax in peritoneal dialysis, malfunction of gastrostomy button, splenic rupture, inguinal hernia, esophageal perforation</td>
</tr>
<tr>
<td>Genitourinary system</td>
<td>Urinary incontinence, inversion of bladder through urethra</td>
</tr>
<tr>
<td>Musculoskeletal system</td>
<td>Rupture of rectus abdominis muscles, rib fractures, intercostal muscle rupture, cervical disc prolapse</td>
</tr>
<tr>
<td>Miscellaneous</td>
<td>Disruption of surgical wounds, constitutional symptoms, self-consciousness, hoarseness, dizziness, fear of serious disease, decrease in the quality-of-life, social embarrassment, depression, petechiae</td>
</tr>
</tbody>
</table>

Table 2. Causes of Chronic Cough\textsuperscript{9}

<table>
<thead>
<tr>
<th>Conditions</th>
<th>Causes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Respiratory conditions</td>
<td>Postnasal drip syndrome (upper airway cough syndrome), postinfectious cough, asthma, acute bronchitis</td>
</tr>
<tr>
<td>Other causes</td>
<td>Allergic or vasomotor rhinitis, abscess, sinusitis, allergic inflammation, aspiration, bronchiectasis, bronchitis, chronic obstructive pulmonary disease, cystic fibrosis, eosinophilic bronchitis, interstitial lung disease, pertussis, primary or metastatic lung tumors, sarcoidosis, tuberculosis</td>
</tr>
<tr>
<td>Nonrespiratory conditions</td>
<td>Gastroesophageal reflux disease, recurrent aspiration</td>
</tr>
<tr>
<td>Other causes</td>
<td>Left ventricular failure, mitral stenosis, psychological response, pulmonary infarction</td>
</tr>
</tbody>
</table>

while gastroesophageal reflux disease is a common non-respiratory cause. The respiratory and nonrespiratory etiologies of chronic cough are summarized in Table 2.\textsuperscript{9}

POSTNASAL DRIP SYNDROME/UPPER AIRWAY COUGH SYNDROME: DIAGNOSTIC APPROACHES

In general, adults produce about 20-30 mL of nasal mucus every day, which is either expectorated or swallowed with saliva. Very often, patients complain of a sensation of secretions from the nose or paranasal sinuses into the pharynx, leading to throat clearing, coughing or both.\textsuperscript{3}

Postnasal drip syndrome is considered as one of the most common causes of chronic cough with reported incidence between 6% and 73% of a studied population (see Fig 1).\textsuperscript{10} It is also commonly associated with the common cold (acute cough).\textsuperscript{11} Postnasal drip syndrome has been renamed upper airway cough syndrome by the guideline committee of the American College of Chest Physicians (ACCP) because it is not clear whether the cough is caused by irritation from direct contact with
postnasal drip or by inflammation of cough receptors in the upper airway.\textsuperscript{11}

Upper airway cough syndrome may result from a number of distinct etiologies, but it commonly arises from rhinitis or rhinosinusitis.\textsuperscript{11}

**Diagnosis**

As postnasal drip is not a disease, but a symptom, the diagnostic approach should take into consideration a combination of criteria, including symptoms, physical examination findings (including deviated nasal septum, turbinate hypertrophy, polyps, sinusitis), radiographic findings and response to specific therapy.\textsuperscript{11}

- Common symptoms suggestive of upper airway cough syndrome include throat clearing, sensation of postnasal drip, nasal congestion or discharge, cobblestone appearance of the oropharyngeal mucosa and previous history of upper respiratory illness (e.g., cold).\textsuperscript{11}
- Other symptoms that may help in diagnosing upper airway cough syndrome include cough triggered by deep breath, laughing or prolonged talking; nasal quality of voice due to concomitant nasal blockade, congestion and hoarseness of voice.
- An empiric trial of antihistamine/decongestant therapy with a first-generation antihistamine should be administered. Improvement or resolution of cough with this therapy helps in confirming the diagnosis of upper airway cough syndrome.\textsuperscript{11}
- Topical administration of corticosteroid spray with concomitant use of antibiotics is also recommended. Antibiotics should be initiated in case of sinusitis or mucopurulent sinusitis.
- Plain sinus radiography and computed tomography imaging are used for the evaluation of postnasal drip if it is the suspected cause for chronic cough.\textsuperscript{12}

**POSTINFECTIONOUS COUGH: DIAGNOSTIC APPROACHES**

Postinfectious cough is suspected when a patient with a normal chest radiograph complains of persistent cough (>3 weeks) after an upper respiratory tract infection. It occurs in about 11-25% of patients with persistent cough. Increased frequency of postinfectious cough (between 25% and 50%) has been observed during outbreaks of *Mycoplasma pneumoniae* and *Bordetella pertussis* infections. Common pathogens that cause chronic cough in children include respiratory viruses (particularly respiratory syncytial virus and parainfluenza), *M. pneumoniae*, *Chlamydia pneumoniae* (strain TWAR), and *B. pertussis*.\textsuperscript{13}

Pertussis, also called whooping cough, is a severe and debilitating disease that can last for weeks to months and can occur in both children and adults. The cough in adult patients with *B. pertussis* infection is spasmodic in nature and occurs more frequently at night. Although cough generally lasts for 4-6 weeks, it can persist longer in some patients.\textsuperscript{13}

Although, the exact pathophysiology of postinfectious cough is not known, it is believed to occur as a result of airway inflammation with or without transient airway hyperresponsiveness.\textsuperscript{13}

**Diagnosis**

Although, the clinical diagnosis of postinfectious cough is by exclusion, a careful history, physical examination, as well as serology and sputum culture (if positive) can provide important clues to the diagnosis.\textsuperscript{13-15}

- When a patient complains only of cough after a respiratory tract infection for at least 3 weeks, but not more than 8 weeks and has a normal chest radiograph, a diagnosis of postinfectious cough should be considered.
- In case of suspected *M. pneumoniae* infection, a high cold agglutinin titer or acute and convalescent-specific serologic studies could help confirm the diagnosis.
- When a patient has a cough lasting for >2 weeks without any other apparent cause and is associated with, post-tussive vomiting and/or an inspiratory whooping sound, the diagnosis of *B. pertussis* infection should be made. The confirmatory diagnosis of *B. pertussis* infection can be made by detection of the organism from nasopharynx secretions.

**MANAGEMENT OF DRY COUGH**

Recent guidelines published by the ACCP recommend the use of a first-generation antihistamine in combination with a decongestant for the treatment of chronic cough due to upper airway cough syndrome.\textsuperscript{11} Nonpharmacological approach such as nasal breathing exercises may also be useful in patients with upper airway cough syndrome. In patients with postinfectious cough, ACCP recommends that if cough persists despite use of inhaled ipratropium, then use of inhaled corticosteroids can be considered. Use of macrolides is recommended in patients with *B. pertussis* or *M. pneumoniae* infection. ACCP also recommends use of antitussive agents such as codeine and dextromethorphan in the management of postinfectious cough when the cough adversely affects the patient’s quality-of-life despite all other measures.\textsuperscript{15}
Antitussive agents including codeine, pholcodine and dextromethorphan are widely used alone or in combination with antihistamines, decongestants and expectorants for effective symptomatic relief of dry cough. Codeine, in addition to antitussive effect, possesses analgesic and minor sedative effects, which can be especially beneficial in relieving painful cough.\(^\text{16}\)

**CONCLUSION**

Cough, a common symptom for which patients visit primary care physicians, is normally a self-limiting illness. However, it can become a persistent symptom in several cases. Persistent cough is associated with several physical and psychological complications. Upper airway cough syndrome, postinfectious cough, asthma and acute bronchitis are the most common respiratory causes of chronic cough. Diagnosis of upper airway cough syndrome requires consideration of a combination of criteria, including symptoms, physical examination findings, radiographic findings and response to specific therapy. The clinical diagnosis of postinfectious cough is usually made by exclusion. A first-generation antihistaminic agent in combination with a decongestant is recommended for the treatment of chronic cough due to upper airway cough syndrome. When cough adversely affects a patient’s quality-of-life, centrally-acting antitussive agents such as codeine and dextromethorphan should be considered.

**REFERENCES**

patients every minute get confident cough relief

In Persistent Dry Cough

**PHENSEDYLF**

Codeine Phosphate IP 10 mg and Chlorpheniramine Maleate IP 4 mg per 5 ml

The Expert's Confidence in Cough Relief

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**Abridged Prescribing Information**

**Phensedyl Cough Linctus**

**Composition:** Each 5 ml contains: Codeine phosphate IP 10 mg, Chlorpheniramine maleate IP 4 mg. Indications: For the symptomatic relief of uncomplicated cough. Dosage: Adults & children above 12 years: 5-10 ml, two to three times daily. Children 6-12 years: 2.5-5 ml, two to three times a day. The recommended doses should not be exceeded. Contra-indications: Known hypersensitivity to any of the components of the formulation, pregnancy (first trimester), cough associated with asthma and MAO inhibitor therapy within the previous 14 days. Precaution: A thorough assessment of the risk-benefit ratio should be made before using the product in patients with cardiovascular disease. To be used during pregnancy only if the potential benefit outweighs the potential risk. Not recommended in nursing mothers. Not advisable to take the drug except under medical supervision. Undesirable effects: Generally well tolerated. Unresponsive effects seen are sedation, nausea, vomiting, diarrhea, urinary retention, dryness of mouth and CNS depression, particularly respiratory depression. Interactions: Concurrent administration of anticholinergics can lead to cholinergic toxicity. Concurrent administration with sympathomimetics, psychotropics, and alcohol may cause potentiation of CNS depression. Presentations: Bottle of 50 ml, 100 ml. Revised edition 2013, 23.0.09. 1/33

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