Evaluation and Treatment of Chronic Cough

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INTRODUCTION

Cough is one of the most common symptoms for which patients seek medical care in the United States. In 2010, there were an estimated 30 million visits and $600 million spent on over-the-counter and prescription medications for cough.1,2 As part of the body’s defense mechanism against inhaled irritants and respiratory infections, cough is a natural and universal occurrence, and fortunately in most people it resolves soon after the inciting factor is gone, usually within 3 weeks (termed acute cough). However, at some point, many nonsmoking adults will experience a subacute cough lasting 4 to 6 weeks. This is often termed a subacute or persistent cough.

KEY POINTS

- Chronic cough is a common problem among adults that can result in a wide range of physical and psychological complications including urinary incontinence, insomnia, depression, and anxiety.
- The history should focus on the comorbid risk factors such as history of human immunodeficiency virus and cancer, as well as red-flag symptoms (eg, weight loss, hemoptysis) suggesting a serious, life-threatening cause.
- Owing to its prevalence and relatively straightforward intervention, clinicians should ask about cigarettes and angiotensin-converting enzyme inhibitors (ACE-I).
- A 2-view chest radiograph is an essential part of the evaluation.
- A chronic cough in an otherwise healthy patient with a normal chest radiograph who is not taking ACE-I is mostly likely due to upper airway cough syndrome, asthma, or gastroesophageal reflux disease, in that order.

KEYWORDS

- Cough
- Chronic cough
- Primary care
- Cough-variant asthma
- Post nasal drip
- Upper airway cough syndrome
- Gastroesophageal reflux

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7 weeks and up to one-fourth of people will experience a chronic cough, defined as lasting more than 8 weeks. Identifying a cause and managing a person with a chronic cough is challenging for clinicians, and in response in 1998 the American College of Chest Physicians (ACCP) developed evidence-based clinical practice guidelines to provide a systematic approach to diagnosing and managing chronic cough, which was subsequently updated and revised in 2006.

**A FEW WORDS ON ACUTE COUGH**

The most common, and most important, cause of acute cough is acute bronchitis, which is most often viral. *Mycoplasma* and *Chlamydia* pneumonia are the cause in 1% to 5% of young adults. Many patients seek treatment for acute cough and believe they need antibiotics. Misperception of a “normal” duration of cough resulting from an upper respiratory infection (URI) may be part of the reason patients seek evaluation and ask for antibiotic treatment. In a study looking at patients’ perception of how long a URI-associated cough lasts, cough was thought by subjects to last a mean of 7 to 9 days compared with the actual mean length of cough of 17.8 days in the published literature. There are limited data showing any benefit of symptomatic relief for acute cough with suppressants such as dextromethorphan and codeine. There is no evidence that β-agonists are helpful for cough related to acute bronchitis in the absence of asthma. Most importantly, there is no evidence that antibiotics are beneficial in the treatment of acute bronchitis.

*Case Presentation.* A 52-year-old woman presents to her primary care physician with a 3-month history of a dry cough. The cough has been worsening over the past month and is increasingly affecting her sleep. She reports feeling embarrassed by her coughing at work and social gatherings. Two days ago, she vomited following a severe bout of coughing, prompting a visit to the doctor.

**IMPACT OF CHRONIC COUGH**

A wide range of complications can occur from coughing, including urinary incontinence, insomnia, exhaustion, headaches, vomiting, gastroesophageal reflux, loss of appetite, subconjunctival hemorrhage, rib pain, and throat pain. Rarely, vigorous coughing can result in serious problems such as syncope, rib fracture, inguinal or abdominal wall herniation, and diaphragmatic rupture. Furthermore, the emotional and psychological impact can be profound. In a study of older adults with chronic cough, almost all reported feeling anxious that “something’s wrong,” and one-third expressed a specific fear of cancer. Almost half were self-conscious about their coughing. Several studies of quality of life (QoL) have demonstrated that patients tended to have depression, anxiety, and social isolation associated with their chronic cough. In particular, women experiencing stress urinary incontinence reported worse QoL scores and were more inclined to seek medical attention for their chronic cough.

*Case Presentation, Continued.* Her primary care physician inquires further. She is a schoolteacher and has never smoked. She has no significant health conditions and is not currently on any medications. Specifically, the patient has no prior history of human immunodeficiency virus (HIV), cancer, recent foreign travel, or environmental exposures. In addition, she has had no associated hemoptysis, fevers, weight loss, or dyspnea. Her physical examination is normal, including no abnormalities of the mouth, nose, pharynx, neck, heart, and lungs. A 2-view chest radiograph is also normal.
DIFFERENTIAL DIAGNOSIS AND INITIAL EVALUATION

A chronic cough can be the primary symptom of a variety of underlying conditions, including life-threatening diseases such as chronic obstructive lung disease (COPD), atypical pulmonary infections, malignancy, heart failure, and idiopathic pulmonary fibrosis (Box 1, Fig. 1). Clinicians should be aware of possible red flags and risk factors that would prompt further testing. For example, an expedited workup for tuberculosis is indicated in a patient from an endemic country who presents with a chronic cough.

**Box 1**
List of potential causes of a chronic cough (duration of 8 weeks or more) in an adult

*Common conditions*
- ACE-I cough
- Chronic bronchitis caused by cigarette smoking
- Upper airway cough syndrome (formerly postnasal drip)
- Asthma
- Gastroesophageal reflux disease
- Nonasthmatic eosinophilic bronchitis

*Less common conditions*
- Postinfectious (pertussis, mycoplasma)
- Interstitial lung disease
- Bronchiectasis
- Obstructive sleep apnea
- Primary lung cancer
- Heart failure
- Tuberculosis
- Environmental exposures

*Uncommon conditions*
- Sarcoidosis
- Environmental exposures (eg, pneumoconiosis from asbestosis)
- Recurrent aspiration
- Chronic tonsillar enlargement
- Chronic irritation to auditory canal (cerumen or foreign body)
- Idiopathic pulmonary fibrosis
- Aspirated foreign body
- Endemic fungi
- Paragonimiasis
- Peritoneal dialysis
- Cystic fibrosis
- Tracheomalacia
- Aberrant innominate artery
- Habit or tic cough
hemoptysis and unintentional weight loss. Similarly, an older patient with a history of tobacco use is at increased risk for primary lung cancer. Pulmonary metastases may be a consideration in a patient with a history of cancer. Moreover, immunosuppression and immune deficiency conditions, such as HIV infection, make patients susceptible to a wider spectrum of pulmonary infections including environmental fungi and bacteria. Table 1 lists dangerous conditions and their possible associations that clinicians should be vigilant for.

Fig. 1. Algorithm of the evaluation and management of chronic cough in adults. ACE-I, angiotensin-converting enzyme inhibitor; H1 blocker, H1-receptor blocker (antihistamine); HIV, human immunodeficiency virus; ICS, inhaled corticosteroid; PPI, proton-pump inhibitor; UACS, upper airway cough syndrome.
Other elements of the history and physical examination may be helpful in suggesting a cause of a chronic cough. For instance, the finding of wheezing on a chest examination would warrant pulmonary function tests (PFTs) or, alternatively, empiric treatment directed at asthma. Moreover, significant sputum production is more likely to be associated with a primary lung disease. The perception of the site from where the cough originates (e.g., tickle in the throat vs the thorax) can be misleading and has little correlation with the actual pathologic location. One study goes further, suggesting that the character, timing, or complications of a chronic cough is diagnostically unhelpful. However, it should be noted that participants in this study were recruited from a university-based specialty clinic and may not reflect the typical patient presenting to primary care.  

There are 2 high-yield elements of the history that clinicians need to be attentive to: the use of an angiotensin-converting enzyme inhibitor (ACE-I) and cigarette smoking. Approximately 10% of patients taking an ACE-I will be affected, but according to reports from China this figure can be as high as 44%. Women and nonsmokers also seem to have a higher incidence. The frequency or intensity of the cough does not seem to be dose related. Determining whether an ACE-I is the culprit can be challenging, but a temporal association can be helpful if it was initiated during the preceding year and before the onset of the cough. In predisposed persons, the cough frequently appears soon after the first dose, but has been reported to occur after weeks to months of regular use. Complicating the picture, however, is the possibility that the cough was originally triggered by an unrelated cause that has since resolved (e.g., a respiratory infection or environmental irritant) but is potentiated and prolonged by the ACE-I, which may have been started later. For this reason, the ACCP guidelines recommend that an ACE-I be stopped regardless of the temporal relationship. Angiotensin-receptor blockers (ARBs) infrequently cause a cough, making it a good alternative. One can expect the cough to resolve within 1 to 4 weeks of cessation of the ACE-I, although it can occasionally linger for several months afterward.  

Of equal importance is to inquire about current cigarette smoking or exposure to second-hand smoke, because it is highly prevalent and is a common cause of a chronic cough. Exposure to smoke can cause airway inflammation and excessive secretions in addition to varying degrees of airway obstruction. Clinically, chronic bronchitis is defined as a cough with sputum production present on most days for at least 3 months for 2 consecutive years. Although there is a dose-response relationship and cutting back on smoking can help, clinicians should counsel their patients to

<table>
<thead>
<tr>
<th>Condition</th>
<th>Suggestive Clinical Features</th>
</tr>
</thead>
<tbody>
<tr>
<td>Asthma</td>
<td>Wheezing, triggers such as exercise, cold air</td>
</tr>
<tr>
<td>Tuberculosis</td>
<td>Fever, weight loss, night sweats, hemoptysis, from an endemic area</td>
</tr>
<tr>
<td>Primary lung cancer</td>
<td>Weight loss, hemoptysis, smoking history, older age</td>
</tr>
<tr>
<td>Metastases to lungs</td>
<td>History of cancer</td>
</tr>
<tr>
<td>Heart failure</td>
<td>History of cardiac disease, dyspnea, orthopnea, dependent edema</td>
</tr>
<tr>
<td>Chronic obstructive pulmonary disease</td>
<td>Smoking history, chronic sputum production</td>
</tr>
<tr>
<td>Interstitial lung disease</td>
<td>Dyspnea, possible environmental exposure, inspiratory crackles present on lung examination</td>
</tr>
</tbody>
</table>
completely quit in light of the other well-known associated health risks. Adjunctive use of nicotine replacement therapy can be helpful. In most patients who successfully quit, the chronic cough is expected to resolve. With advanced stages of COPD, however, the likelihood of full recovery to a baseline state diminishes.

A 2-view chest radiograph is an essential part of the initial evaluation of a chronic cough. Statistically, most results will be normal, but a radiograph can potentially reveal a specific cause such as an atypical infection or the finding feared by patients, a lung mass. Pulmonary function testing can also be considered during the initial evaluation and may point toward a diagnosis of COPD, asthma, or a restrictive lung disease.

With a normal chest radiograph in an otherwise healthy adult who does not use an ACE-I or cigarettes, chronic cough is most commonly caused by 3 conditions: upper airway cough syndrome (UACS), asthma, or gastroesophageal reflux disease (GERD). In fact, the current literature suggests that these 3 causes constitute more than 90% of cases of chronic cough. Nonasthmatic eosinophilic bronchitis, postinfectious cough attributable to *Bordetella pertussis*, obstructive sleep apnea, and bronchiectasis from a variety of causes are reported less commonly. Unfortunately, little research has been conducted in primary care settings where the prevalence of these diseases probably differs from the published reports, which are largely based on the experiences of secondary and tertiary care settings. There also seem to be regional differences. Whereas studies from the United States and Europe report a high prevalence of GERD as the primary cause of the cough, this appears to be practically nonexistent in China and Japan, perhaps reflecting differences in diet, body habitus, or both.

*Case Presentation, Continued.* The patient is greatly relieved to hear that her chest radiograph is normal. Contemplating the next step, her physician comments that the evaluation up to now has not revealed any obvious causes. Rather than pursuing further testing, however, he recommends empiric treatment directed at the 3 most common causes, starting with UACS. He gives her a prescription for diphenhydramine 25 mg and phenylephrine 20 mg, both to be taken every 8 hours.

He receives a phone call from the patient 3 weeks later stating that her cough is unchanged despite using the antihistamine and decongestant daily. He considers the possibility that she has cough-variant asthma and orders PFTs with pre- and postbronchodilator spirometry.

One week later, the patient returns to the office. He informs her that the PFT results were normal with no demonstration of reversible airflow obstruction. Despite this, he recommends to begin treatment directed at asthma. He gives her a prescription to use an albuterol inhaler, 2 puffs every 6 hours as well as beclomethasone, 2 puffs every 12 hours.

**OVERVIEW OF TREATMENT**

Treatment should be directed at the most likely condition based on the history, physical examination, and chest radiograph. However, when no cause of a chronic cough is apparent the guidelines from the ACCP recommend sequential targeting of the 3 most common conditions, UACS, asthma, and GERD, in order of prevalence, before embarking on a search for less common diagnoses. Of importance is that UACS, asthma, and GERD can each potentially present “silently” with cough as its only symptom. Given that more than 1 of the aforementioned causes may be present, the ACCP
recommends that each subsequent empiric therapy be added onto the step prior. In clinical practice, however, the authors have found that patients often baulk at the increasing number of medications and accompanying concern for polypharmacy.

UPPER AIRWAY COUGH SYNDROME

UACS was previously referred to as postnasal drip syndrome, which typically presents with a sensation of secretions dripping down the posterior nasal passage and pharyngeal wall. Accompanying this may be nasal congestion, rhinorrhea, frequent throat clearing, or globus pharyngeus. The oropharyngeal examination may reveal mucopurulent secretions draining from the nasopharynx or hypertrophy of lymphoid tissue (cobblestoning; Fig. 2). That said, researchers have struggled with the fact that these signs and symptoms seem to correlate poorly with the complaint of cough. Given this uncertainty, experts advocate for the adoption of the newer term, UACS, in an attempt to separate the notion of postnasal drip from coughing attributable to an upper airway cause. Underlying inciting factors in the upper airway includes allergic rhinitis, vaso-motor rhinitis, sinusitis, and rhinitis medicamentosa, which is a paradoxic rebound effect from the overuse of nasal decongestants. These inciting factors should be addressed as appropriate, but if none is evident during the initial evaluation, empiric therapy for UACS is recommended. The diagnosis of UACS is established in retrospect, by the resolution of the cough in response to empiric therapy.

The initial treatment of UACS is a combination of a first-generation antihistamine (eg, diphenhydramine or chlorpheniramine) and decongestant (eg, pseudoephedrine or phenylephrine). Second-generation antihistamines, though having a more favorable side-effect profile, seem to be less effective, perhaps because of their limited anticholinergic action that helps to reduce secretions. For patients with rhinitis or nasal congestion, the addition of nasal corticosteroids, nasal anticholinergic agents, or nasal antihistamines may also be effective.

Fig. 2. Cobblestone appearance of the posterior pharynx from postnasal drip.

COUGH-VARIANT ASTHMA

The typical symptoms of asthma are intermittent episodes of wheezing, chest tightness, breathlessness, and cough. However, a subset of asthmatics will have cough-variant asthma, which manifests as a chronic cough as the only symptom with an otherwise normal physical examination. In studies of patients with chronic cough
and a normal chest radiograph, asthma accounted for approximately one-third of all causes.\textsuperscript{11,16,28} Cough-variant asthma is more common in studies done in China, where it is the most common cause of chronic cough.\textsuperscript{28} In patients suspected of having cough-variant asthma, PFT is the initial test and should include forced expiratory volume in 1 second (FEV\textsubscript{1}), forced vital capacity (FVC), and FEV\textsubscript{1}-to-FVC ratio. The presence of an airway obstruction that improves after the administration of a bronchodilator agent is highly suggestive of asthma. The authors also recommend simultaneously assessing lung volume and diffuse capacity, in case the airway obstruction is irreversible, which would point toward a diagnosis of COPD. Obtaining accurate PFT measurements requires a high level of effort from the patient, and uncontrolled coughing during test makes it almost impossible. Failure to demonstrate a reversible airway obstruction does not exclude the diagnosis of asthma, and bronchoprovocation testing, such as the methacholine inhalation challenge, can be considered to confirm the diagnosis.\textsuperscript{3} For safety reasons, a baseline FEV\textsubscript{1} of at least 70% predicted should be documented before bronchoprovocation testing.\textsuperscript{31} The negative predictive value of a methacholine challenge test is reported to be close to 100, so a negative result essentially rules out asthma.\textsuperscript{18} According to the ACCP, if methacholine challenge is not available or cannot be performed, empiric antiasthma treatment is indicated.

In terms of treatment, patients should be educated about potential triggers including cold air, occupational allergens, smoke, animal dander, pollen, physical exercise, and certain foods. Inhaled corticosteroids (ICSs) such as beclomethasone or fluticasone and a \( \beta \)-agonist such as albuterol are the recommended initial treatment. The evidence for empiric treatment of chronic cough, however, is less clear according to a recent Cochrane review. The investigators caution against empiric treatment and advocate a thorough investigation to confirm the diagnosis before starting inhaled corticosteroids.\textsuperscript{32} In their clinical practice, the authors obtain full PFTs, but even if these are negative will prescribe a trial of ICS and a bronchodilator. The risk of side effects is low and patients generally experience improvement within 1 to 2 weeks of initiation if they indeed have cough-variant asthma.\textsuperscript{18,33,34} In addition, the authors are careful to review the proper technique of using a metered dose inhaler and routinely offer an aerochamber to help maximize drug delivery to the lungs. Occasionally the addition of a leukotriene receptor inhibitor such as montelukast can help. For severe and refractory cough, a short course (1 week) of oral corticosteroids can be considered.\textsuperscript{3,33} Failure to respond to these empiric therapies should prompt the clinician to consider another cause; in contrast to the ACCP recommendations, the authors rarely order bronchoprovocation challenge testing because it adds little diagnostically.

\textit{Case Presentation, Continued.} The patient returns 4 weeks later. Unfortunately, neither inhaler offered any improvement in her cough. She has been living with the cough for almost 5 months and is very discouraged by the lack of improvement. Her physician again inquires about any symptoms related to the cough. She denies any associated dyspnea, pain, fevers, weight loss, heartburn, or dyspepsia. He explains that after addressing UACS and asthma, GERD remains a strong possibility as a cause of chronic cough even without any gastrointestinal symptoms. At his suggestion, she agrees to a trial of daily proton-pump inhibitor (PPI) medication. In addition, he offers her a referral to a consulting pulmonologist.

\textbf{GASTROESOPHAGEAL REFLUX DISEASE}

GERD is thought to trigger a cough when gastric contents flow back through a relaxed lower esophageal sphincter (LES) into the esophagus, larynx, and respiratory tract.
Physiologic reflux and microaspiration has been demonstrated in asymptomatic persons, and it is therefore unclear why certain individuals seem to have heightened cough sensitivity in response to this trigger. Intuitively, it is easy to imagine how the gastric acidity would irritate and trigger cough receptors located in the esophagus and respiratory tract. Several experiments have shown that infusing acid solution into the distal esophagus of normal subjects can produce a cough. However, there is mounting evidence, including a 2011 Cochrane review, that acid-suppression therapy, though helpful for heartburn and dyspepsia, improves the symptom of cough in only a minority of patients. With so many unanswered questions about the pathogenesis of GERD-related cough, use of the more general term reflux disease is favored over acid reflux disease.

The frequency of GERD as the causative factor in chronic cough is unclear. Published reports vary widely, ranging between 0% and 73%, which may possibly reflect regional differences in prevalence and heterogeneity in the methods of diagnosis. Establishing a causal connection is complicated by the fact the GERD can coexist with chronic cough as well as be the result of coughing. Studies have demonstrated that reflux events following coughing are common, perhaps related to increased intra-abdominal pressures and relaxation of the LES, which may in turn perpetuate a cough-reflux cycle.

The current guidelines for the management GERD-associated cough are largely driven by expert opinion. The ACCP recommends targeting GERD after UACS and asthma, even in patients with no heartburn, regurgitation, or sour taste. In lieu of testing, empiric treatment is recommended, beginning with lifestyle changes (eg, weight loss, smoking cessation, and limiting intake of fatty and acidic foods, alcohol, chocolates, coffee, and teas) and PPI therapy for at least 8 weeks. Prokinetic agents may also be added if there little response to initial therapy. The authors concur with the ACCP’s empiric approach primarily because the available tests such as 24-hour pH monitoring would not necessarily alter the decision to recommend a course of antireflux therapy, of which there are relatively few options. Given the low likelihood of a significant response to PPIs, the authors do not wait 8 weeks for a response but rather concurrently pursue investigation into other causes. At this point, there is also a low threshold to refer the patient to a specialist. The authors’ institution rarely offers anti-reflux surgery such as fundoplication for patients with the sole symptom of chronic cough, and certainly only after a sufficiently long trial on medical therapy and a thorough investigation including 24-hour pH monitoring, barium esophagography, and endoscopy.

LESS COMMON CAUSES OF CHRONIC COUGH

Chronic cough in adults who do not use cigarettes or ACE-I and have a normal chest radiograph is mostly like the result of UACS, asthma, or GERD. However, in those for whom the diagnosis remains undetermined, there are several important less common causes to be considered. A full discussion is beyond the scope of this review, but 2 important but underrecognized conditions are addressed here.

Nonasthmatic eosinophilic bronchitis (NAEB) is a common cause of chronic cough that in some series may be more common than GERD-related cough, especially in certain regions such as China and Japan. Similar to asthma, it is characterized by eosinophilic inflammation of the airways but, importantly, reversible airway hyperresponsiveness is not present. Consequently, the primary treatment is ICSs but not β-agonist agents. In addition to a normal chest radiograph and PFTs, the presence of eosinophils on an induced sputum cell analysis is diagnostic according to the expert
guidelines. Unfortunately, primary care offices and even many pulmonary clinics are not equipped to properly obtain an induced sputum sample.\textsuperscript{18,40,43,44} The authors’ approach is to address NAEB together with asthma, because the 2 conditions overlap in diagnosis and therapeutics. Patients are offered a trial of ICSs for at least 4 weeks, even if the PFTs are normal, and asthma and NAEB as a cause is considered unlikely if there is no improvement in the cough. Similarly to UACS and asthma, patients are asked about any possible environmental or occupational aggravating factors, especially those that can be easily avoided.

Whooping cough is increasingly recognized as a cause of a prolonged postinfectious cough. The etiologic agent is the bacterium \textit{Bordetella pertussis}, which is highly contagious. Whereas it can cause serious disease and possibly death in unvaccinated infants and young children, adults rarely exhibit the classic symptoms including the characteristic inspiratory whooping sound between coughs and posttussive emesis. Instead, infected adults may manifest no symptoms or a range of milder symptoms, including nonspecific URI symptoms and prolonged cough.\textsuperscript{26} Given how difficult it is to clinically assess adults’ likelihood of having pertussis as the cause of a chronic cough, it is tempting to order laboratory testing, empirically treat with antibiotics, or both. Nasopharyngeal swabs for culture and the polymerase chain reaction both are diagnostic, but the window of usefulness is only during the first 4 weeks of illness. By contrast, serologic testing can be done in the later stages (4–12 weeks) and can confirm the diagnosis if there is a 4-fold increase in immunoglobulin G antibody levels; this would, however, require the forethought of obtaining an early serum sample during the acute phase.\textsuperscript{45} Antibiotics are effective in eradicating the \textit{B pertussis} and reducing transmission during the first several weeks of the illness. However, according to a Cochrane systematic review, treatment did not significantly alter the course of the illness, including cough.\textsuperscript{46}

\textbf{COUGH HYPERSENSITIVITY SYNDROME}

There is growing evidence that the body can naturally modulate the sensitivity of the cough reflex sensors. This occurrence is commonly noticed after an acute URI when a person can experience a paroxysm of coughing in response to relatively minor triggers such cold air, inhaled aerosols, laughing, and taking a deep breath. This heightened cough sensitivity normally usually returns to baseline after 2 to 3 weeks.\textsuperscript{43} For some people, however, this state of hypersensitivity persists long after the original stimulus is gone. Researchers are unclear as to which factors lead to cough reflex hypersensitivity, and some have hypothesized that it may be an underlying feature of all cases of chronic cough regardless of the aggravating conditions, whether GERD, asthma, or ACE-I use. Furthermore, it is uncertain whether these conditions cause cough hypersensitivity or serve as a trigger for an already sensitized person.\textsuperscript{40}

While the concept of cough hypersensitivity syndrome continues to evolve we are increasingly recognizing the clinical implications, particularly for patients who, after an extensive evaluation and strict adherence to empiric therapies, are stuck with the label of “unexplained chronic cough.” New treatment approaches, which attempt to reset the sensitivity of the cough reflex (peripheral and central), are under investigation.\textsuperscript{42} For example, gabapentin, a central neuromodulator used in a variety of conditions including as an analgesic for neuropathic pain, is currently being studied and eventually may have a role in the management of a chronic cough.\textsuperscript{47} Certain peripherally located transient receptor potential channels are also the potential targets for new antitussive agents.\textsuperscript{43}
SUMMARY

Chronic cough is a frustrating and common problem, resulting in significant psychological and physical sequelae as well as enormous financial costs in terms of healthcare expense and time lost from work. Decreased QoL and depression are common. However, using a systematic approach, including assessing whether the patient uses ACE-I and cigarettes, excluding the presence of red flags and risk factors for life-threatening diseases, and obtaining and normal chest radiograph, more than 90% of cases of chronic cough are diagnosed as being caused by UACS, asthma, or GERD. It is recommended to address these conditions sequentially, starting with UACS. Nonasthmatic eosinophilic bronchitis and pertussis infections are unrecognized by primary care providers and should be considered after UACS, asthma, and GERD have been addressed. Finally, cough hypersensitivity syndrome is a new area of research and has been hypothesized to be the underlying factor in many cases of chronic cough, regardless of the inciting factor. More clinical research is needed to further elucidate the cough reflex pathway and the factors involved in modulating its sensitivity, which may eventually lead to new antitussive therapeutics.

REFERENCES


