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Cough and the Common Cold

ACCP Evidence-Based Clinical Practice Guidelines

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Objective: To review the literature on cough and the common cold.

Methods: MEDLINE was searched through May 2004 for studies published in the English language since 1980 on human subjects using the medical subject heading terms “cough” and “common cold.” Selected case series and prospective descriptive clinical trials were reviewed. Additional references from these studies that were pertinent to the topic were also reviewed.

Results: Based on extrapolation from epidemiologic data, the common cold is believed to be the single most common cause of acute cough. The most likely mechanism is the direct irritation of upper airway structures. It is also clear that viral infections of the upper respiratory tract that produce the common cold syndrome frequently produce a rhinosinusitis. In the setting of a cold, the presence of abnormalities seen on sinus roentgenograms or sinus CT scans are frequently due to the viral infection and are not diagnostic of bacterial sinus infection.

Conclusion: Cough due to the common cold is probably the most common cause of acute cough. In a significant subset of patients with “postinfectious” cough, the etiology is probably an inflammatory response triggered by a viral upper respiratory infection (*ie*, the common cold). The resultant subacute or chronic cough can be considered to be due to an upper airway cough syndrome, previously referred to as *postnasal drip syndrome*. This process can be self-perpetuating unless interrupted with active treatment. (CHEST 2006; 129:72S–74S)

Key words: acute cough; common cold; rhinosinusitis; upper respiratory tract infection

Abbreviations: A/D = antihistamine/decongestant; PND = postnasal drip; URTI = upper respiratory tract infection

In preparing this section, MEDLINE was searched through May 2004 for studies published in the English language since 1980 on human subjects using the medical subject heading terms “cough” and “common cold.” Selected case series and prospective descriptive clinical trials were reviewed. Additional references from these studies that were pertinent to the topic were also reviewed.

The common cold is one of the most common infectious diseases of humankind.¹ Adults in the United States experience two to four colds per year. At least 200 identified viruses are capable of causing the common cold²; it is thus more aptly termed the *common cold syndrome*. Implicated viruses include

rhinoviruses, coronaviruses, parainfluenza viruses, respiratory syncytial virus, adenoviruses, and enteroviruses. The histologic effects of infection vary from epithelial destruction to the absence of histologic changes, but all can cause vasodilation and hypersecretion; the clinical syndrome of nasal congestion, nasal discharge, postnasal drip (PND), throat clearing, sneezing, and cough is common to all of these infections. Although there is no prospective study of the causes of acute cough, it has long been considered that the common cold is the single most common cause of acute cough (*ie*, cough < 3 weeks in duration).

The mechanisms by which the viral infection of the common cold engenders cough is unclear. A randomized double-blind placebo-controlled study of cough and the common cold³ has demonstrated statistically significant associations among cough, throat clearing, and PND. Cough also improved in parallel with decreases in throat clearing and PND.

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In this study, treatment with an antihistamine/decongestant (A/D) preparation containing sustained-release pseudoephedrine and a first-generation antihistamine (brompheniramine) led to more rapid improvement in all three symptoms when compared to placebo. The implication of this study is that the primary mechanism responsible for the cough was the associated virus-induced PND. Alternatively, it has been proposed that a viral upper respiratory tract infection (URTI) produces inflammatory mediators that result in an increase in the sensitivity of the afferent sensory nerves in the upper airway. In a prospective study⁴ on healthy volunteers, it was shown that the cough sensitivity to inhaled capsaicin was increased when the volunteers were studied during the acute phase of a viral URTI. A similar increase in cough sensitivity associated with URTI has also been found when using inhaled citric acid⁵ or nebulized distilled water⁶ to induce cough. Moreover, Madison and Irwin⁵ have proposed that this increase in cough sensitivity during URTI may be due to an increased sensitivity of the rapidly adapting sensory receptors in the airway. The rapidly adapting sensory receptors are particularly sensitive to mechanical stimulation,^{7,8} and therefore it should be possible to induce cough with an adequate mechanical stimulus to the upper airway. Recent studies have demonstrated that while healthy subjects do not cough significantly in response to airway vibration, in those having a viral URTI, airway stimulation induces a significantly increased cough response.

Whatever the actual mechanisms of viral URTI-induced cough, the study cited above⁵ demonstrated that an older, first-generation A/D preparation can be effective in reducing the cough. In contrast, studies⁹⁻¹¹ have shown that newer generation "non-sedating" antihistamines are relatively ineffective in the treatment of the common cold. In a randomized, double-blind, placebo-controlled trial¹² of an experimentally induced rhinovirus common cold, the non-steroidal antiinflammatory drug naproxen decreased cough (as well as headache, malaise, and myalgia), supporting the contribution of inflammation to the pathogenesis of cough in the common cold.

As with the treatment of chronic upper airway cough syndrome, there are several available options for the treatment of the symptoms of the common cold in addition to A/D. Topical α -adrenergic therapy can be used in the short term, although no prospective data showing its efficacy are available. However, the possible development of rhinitis medicamentosa makes its prolonged use inadvisable. Because of conflicting data, it is not clear whether zinc-containing compounds are beneficial in treating cough due to the common cold. For example, while zinc-containing lozenges have been prospectively

shown to abbreviate symptoms of the common cold including cough,^{2,13} two other studies^{13,14} and a metaanalysis¹⁵ have disputed this conclusion. While topical anticholinergic therapy has been shown prospectively to decrease rhinorrhea and sneezing,¹⁶ this study did not evaluate cough as a symptom. Interferon therapy has potential adverse side effects and is useful only if used prophylactically.¹⁷ Specific antiviral therapies for the common cold have shown some promise, but their efficacy is limited by the myriad of potential viral causes of the common cold and also by side effects.^{17,18}

It is important to appreciate that a diagnosis of acute bacterial sinusitis cannot be made accurately in the face of an acute viral infection. The separation between sinusitis and rhinitis has some clinical utility, but in the setting of the common cold it has been clearly demonstrated that the viral infection involves all nasal and sinus mucosal surfaces, and that the term *viral rhinosinusitis* is more accurate.^{19,20} In a key study²⁰ looking at CT scans of the sinuses of patients with recent-onset colds, abnormalities of the maxillary sinuses were present in 87% of patients. No patient received antibiotic treatment, and 79% of those scanned again at days 13 to 20 had resolution or marked improvement in imaging abnormalities even when air-fluid levels had initially been observed. While sinus inflammation caused by viral infection may in some patients be a precursor to bacterial sinusitis, the roentgenographic evaluation of the sinuses and the presence of abnormalities have no clinical specificity for bacterial infection within the first week of onset of the common cold.¹⁹ The specificity for a bacterial process increases with an increasing interval from the onset of the original rhinosinusitis. Therefore, clinical judgment is often required to decide when to institute antibiotic therapy.

One of the most important facts to emerge from the prospective study of cough and the common cold cited above is that the placebo group allowed for a close look at the natural history of cough in untreated common colds. On day 14, the last day of the study, while cough and upper airway symptoms were improving, approximately 25% of patients continued to have symptoms of cough, PND, and throat clearing. This correlates well with the finding in the CT scan study of sinus changes in the common cold, in which 21% of patients had significant persistent anatomic abnormalities at day 13 to 20. These data, combined with the studies on the diagnosis and treatment of chronic cough, support the concept that a large subset of patients with postinfectious cough has an inflammatory response triggered by an upper respiratory infection, which causes chronic cough due to upper airway cough syndrome and which can be self-perpetuating unless interrupted with active

treatment. For discussion and recommendations regarding over the counter cough medications for cough due to the common cold, see the Cough Suppressant and Pharmacologic Protussive Therapy section (pp 238S–249S).

SUMMARY OF RECOMMENDATIONS

1. Patients with acute cough (as well as PND and throat clearing) associated with the common cold can be treated with a first-generation A/D preparation (brompheniramine and sustained-release pseudoephedrine). Naproxen can also be administered to help decrease cough in this setting. Level of evidence, fair; benefit, substantial; grade of recommendation, A

2. In patients with the common cold, newer generation nonsedating antihistamines are ineffective for reducing cough and should not be used. Level of evidence, fair; benefit, none; grade of recommendation, D

3. In patients with cough and acute URTI, because symptoms, signs, and even sinus-imaging abnormalities may be indistinguishable from acute bacterial sinusitis, the diagnosis of bacterial sinusitis should not be made during the first week of symptoms. (Clinical judgment is required to decide whether to institute antibiotic therapy.) Level of evidence, fair; benefit, none; grade of recommendation, D

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