

An approach to recommending cough mixtures in the pharmacy

Jacky van Schoor, MPharm, BScHons
Amayeza Info Centre

Correspondence to: Jacky van Schoor, e-mail: jacky@jvschoor.co.za

Abstract

When patients present in the pharmacy with coughs, usually they are caused by a viral upper respiratory tract infection, such as the common cold. Such coughs are self-limiting and improve within a few days with or without treatment. Nonetheless, an acute cough can interfere with patients' daily activities and disrupt their sleep. Pharmacists are often asked to recommend a suitable product to relieve the cough. While the evidence to support that cough medicines are effective is not strong, many patients report that they find them useful. This article provides a brief review on the components and appropriate selection of over-the-counter cough remedies for adults and children with acute coughs that are caused by a viral upper respiratory tract infection. The article takes into account recent concerns about the safety of cough remedies in children.

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Introduction

A cough is a protective reflex action that is caused by an irritated or obstructed airway. Its purpose is to clear the airway so that breathing can continue normally. Coughing remains one of the most common complaints that motivates patients to seek medical attention. Pharmacists are frequently asked to recommend over-the-counter (OTC) cough medicines as a first-line treatment for acute coughs.¹ While many patients report the benefits of taking a cough remedy, there appears to be conflicting evidence on the effectiveness of cough remedies when compared with placebo,¹ as well as concerns about their safety, particularly in young children.^{2,3}

Types of cough

A cough can be classified as acute (lasting three weeks or less) or chronic (lasting longer than eight weeks).⁴ A cough that lasts longer than three weeks following a viral upper respiratory tract infection is usually termed a "post-viral" cough.⁴

An acute cough is usually caused by a viral infection of the upper respiratory tract, but may rarely be caused by a more serious condition, such as pulmonary embolism or pneumonia.⁵ Indications for further investigation include haemoptysis, prominent systemic illness, and suspicion of an inhaled foreign body or lung cancer.⁶ Table I details when to refer a cough to the doctor.

An acute cough following an upper respiratory tract infection is usually self-limiting, but can be difficult to control, and can be associated with impaired quality of life for patients.⁶ Therefore, patients who ask the pharmacist for advice on an acute cough do so because they want relief from symptoms, and while the clinical effectiveness of cough medicines is debatable, they can have a useful placebo effect.⁷

Table I: When to refer a patient with a cough to the doctor⁷

- Coughing that lasts two weeks or more, and is not improving
- Sputum that is yellow, green, rust-coloured or blood-stained*
- Patients who report chest pain, shortness of breath or wheezing
- Patients who have symptoms suggestive of whooping cough or croup
- Patients who have a recurrent nocturnal cough
- Patients who have not responded to appropriate medication for two weeks

* It is important to emphasise to patients that nasal secretions often become thick and purulent without signifying a bacterial infection. Purulent sputum does not necessarily indicate a bacterial infection or the need for an antibiotic.⁸

Nature of coughs

Coughs are described as either "productive" (wet, chesty and producing sputum), or "non-productive" (dry, tickly or tight, with no sputum).⁵

A productive cough should be encouraged because it enables the expulsion of secretions from the lower respiratory tract that if retained, could impair breathing and the ability of the lungs to resist infection.⁵ A non-productive cough serves no useful physiological purpose as no sputum is produced.⁵

Treatment

Acute viral coughing is almost invariably benign, and prescribed treatment can be regarded as unnecessary.⁶ However, acute viral coughing can be distressing, and although there is little evidence of a specific pharmacological effect, patients report benefits from various over-the-counter (OTC) preparations.⁶

Although little evidence has been obtained in clinical trials, the choice of treatment depends upon the type of cough.^{5,6,7} Productive coughs may be treated with an expectorant, such as guaiphenesin. Non-productive coughs may be treated with a cough suppressant, e.g. dextromethorphan, noscapine or pholcodine, if there is no identifiable cause for the cough, and if it is disruptive, e.g. if sleep is disturbed.

Productive coughs should not be treated with a cough suppressant, because the result is pooling and retention of sputum in the lungs and a higher risk of infection.⁷ It is also illogical to use expectorants (which promote coughing) and suppressants (which reduce coughing) together, as they have opposing effects.⁷

Expectorants

Expectorant ingredients include guaiphenesin, ammonium chloride, sodium citrate, glyceryl guaiacolate and ipecacuanha. The dose of guaiphenesin is worth highlighting, in that the amount required to produce expectoration in an adult is 100- 200 mg. Not all products contain a sufficiently high dose.⁵ Other traditional expectorants include squill, creosote and menthol, but they are probably too weak to be effective in the doses used in most cough medicines.⁵

Cough suppressants

There are three main categories of cough suppressants, namely demulcents, centrally acting opioids and antihistamines.

Demulcents

Simple voluntary suppression of a cough may be sufficient to reduce coughing frequency. This may be the mechanism for the effect of simple home-remedies, such as honey, glycerin and lemon, and simple drinks and linctuses.^{5,6} These demulcent remedies soothe and coat the pharynx, have a pleasant taste, and are particularly suitable for children and pregnant women because they lack active ingredients.^{5,7} Demulcents are the recommended treatment for children under the age of two years.⁷

Centrally acting opioids

Centrally acting opioid-like cough suppressants, e.g. codeine, pholcodine, noscapine and dextromethorphan, act on the coughing centre in the brain and reduce the discharge of

nerve impulses to the muscles that cause coughing. Codeine is no more effective than other centrally acting opioids in suppressing coughing, and is associated with a higher incidence of adverse effects.⁵

Antihistamines

Antihistamines that are used in cough preparations include the first-generation antihistamines, diphenhydramine, promethazine, phenyltoloxamine and triprolidine. These antihistamines act as cough suppressants by reducing cholinergic transmission of nerve impulses in the coughing reflex. In theory, these antihistamines reduce the frequency of coughing and also dry up nasal secretions, making them useful when a cough and a cold occur together. Their sedative effect may also be beneficial if the cough is disturbing sleep.⁵ In contrast, the newer, non-sedating antihistamines have no anticholinergic effects and appear to be ineffective in reducing coughing.⁴

Combinations and other constituents of cough medicines

Decongestant combinations

The sympathomimetic decongestants, e.g. phenylephrine, pseudoephedrine, ephedrine and phenylpropanolamine, are frequently used in cough remedies.⁷

An expectorant or decongestant combination can be useful in treating a productive cough.⁷

A clinical trial in adult patients presenting with an acute cough, throat clearing and postnasal drip showed that the combination of a first-generation antihistamine, together with a decongestant, led to more rapid improvement in all three symptoms when compared with placebo.⁴

Antihistamine combinations

The combination of an antihistamine and a cough suppressant may be useful when given as a night-time dose to minimise coughing that is disturbing sleep.⁷

Since an antihistamine suppresses coughing, and an expectorant promotes coughing, the combination of an antihistamine and an expectorant is not therapeutically sound.⁷

Bronchodilator combinations

Theophylline and orciprenaline are included in some preparations for their bronchodilatory effects.⁶

OTC medicines containing theophylline should not be taken at the same time as prescribed theophylline, e.g. for asthma, since toxic blood levels and side-effects may occur.⁷

Bronchodilators are not recommended for acute coughing in non- asthmatic children.⁷

Table II: Selecting a cough preparation^{3,5,7,10,12}

Acute viral cough (associated with the common cold)	
↓	
Pregnant women and children < 2 years	Consider demulcents, e.g. Simple Linctus BP [®] , glycerin, lemon and honey
Non-productive cough?	Productive cough?
↓	↓
Cough suppressant	Expectorant alone or in combination with a decongestant*
Adults	Adults
Opioid-like	Expectorants
• Dextromethorphan	• Guaiphenesin
• Pholcodine	• Ammonium chloride
• Noscapine	• Sodium citrate
• Codeine phosphate	
Antihistamines	Decongestants
• Phenyltoloxamine	• Pseudoephedrine
• Diphenhydramine	• Ephedrine
• Promethazine	• Phenylpropanolamine
• Triprolidine	• Phenylephrine
Children	Children
• Contraindicated < 2 years	• Contraindicated < 2 years
• See manufacturer's recommendations from 2 years	• See manufacturer's recommendations from 2 years

* Oral decongestants are no longer available over the counter as single-ingredient preparations. However, several are available in combination with an analgesic such as paracetamol, or an NSAID such as ibuprofen.¹²

Mucolytics

Mucolytics, e.g. carbocysteine and bromhexine, are included in some cough preparations and are used when thick, sticky and tenacious bronchial secretions are a major problem.

However, their clinical efficacy in treating acute coughing associated with the common cold has not been satisfactorily demonstrated.⁹

Nonsteroidal anti-inflammatory drugs (NSAIDs)

In a randomised trial, the NSAID naproxen decreased coughing, as well as headache, malaise and myalgia.⁴

Recommendations in children

While it is uncertain whether OTC cough medicines are

effective in reducing symptoms in adults, no data show a significant benefit in children compared with placebo.^{10,11} Furthermore, the safety of OTC cough and cold preparations in children is of great concern owing to reports of severe adverse effects and deaths in infants and children.¹⁰ In 2008, the US Food and Drug Administration issued a public health advisory stating that cough and cold preparations that contain decongestants, antihistamines, expectorants or cough suppressants should not be used in children under the age of two years.¹⁰

In South Africa, the Medicines Control Council reviewed safety data and advised that manufacturers update their package inserts for promethazine-containing medicines, to state that these products are contraindicated for use in children who are younger than two years of age.³

Table II assists with the selection of a cough preparation for patients.

Conclusion

Pharmacists are well aware of the debate surrounding the clinical efficacy of available OTC cough remedies. While there is no good evidence for or against the effectiveness of OTC cough medicines,⁷ pharmacists need to inform patients and their caregivers about the concerns regarding their safety in children under the age of two years.

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