

Continuing Professional
Development

CPD

60 Second Summary

Cough is a natural defence reflex which is important in airway clearance. Cough is the most common presentation in primary care and it can cause numerous complications including insomnia, urinary incontinence, ruptured blood vessels, fractured rib and vomiting.

Cough can be acute (duration of less than 3 weeks), subacute (duration of 3–8 weeks) or chronic (duration of greater than 8 weeks). Acute cough is usually caused by upper respiratory tract viral infections, subacute cough is often the residual cough after an infection has resolved and chronic cough can be due to a variety of medical conditions. These medical conditions can include upper airway cough syndrome, gastroesophageal reflux induced cough, cough-variant asthma and non-asthmatic eosinophilic bronchitis. Diagnosing is often through taking medical history, examining clinical symptoms, observing response to treatment, physical examination or diagnostic tests. Various treatment options are possible, depending on the nature of the cough and the underlying aetiology.

Expectorants, demulcents, antihistamines and non-opioid antitussives can be effective in treating cough, depending on the aetiology. Opioid antitussives are no longer recommended in treating cough. Prescription options such as corticosteroids, bronchodilators and leukotriene receptor antagonists are also possible treatment options available on prescription. Pharmacists can be involved in triaging patients, taking a thorough medical history, referring patients with warning signs and counselling patients on their treatment.

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2. IDENTIFY - If the answer is no, I may still be interested in the area but the article may not contribute towards my continuing professional development (CPD). If the answer is yes, I should identify any knowledge gaps in the clinical area.

3. PLAN - If I have identified a

knowledge gap - will this article satisfy those needs - or will more reading be required?

4. EVALUATE - Did this article meet my learning needs - and how has my practise changed as a result? Have I identified further learning needs?

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Management of Cough in Pharmacy

Introduction, Epidemiology and Classification

Cough is a natural defence reflex that involves the sudden expulsion of air from the breathing passage. Coughing is vital in preventing aspiration and is important in airway clearance of foreign particles, fluid, microbes and irritants. Although, cough is a vital protective mechanism, excessive and chronic coughing can be disabling for patients and reduce quality of life.¹ Cough is a common presentation in primary care and is the leading cause of outpatient visits, more than any other symptom.² In most cases, cough is relatively benign but the prognosis relies on the underlying aetiology of the cough.³

Cough can be classified on the basis of duration of the symptom. Acute cough is defined as cough lasting for less than 3 weeks, subacute cough lasts 3–8 weeks and chronic cough has a duration of greater than 8 weeks. Acute cough is often as a result of an upper respiratory tract viral infection such as influenza, the common cold or covid-19. Subacute cough is often the residual cough that remains after an infection has resolved. Chronic cough can be as a result

of a wide variety of medical conditions. Chronic cough can be further categorised into two different subtypes: (i) presence of pulmonary lesions on radiography and (ii) lack of identifiable abnormalities on radiography. Cough can also be classified as non-productive, also known as a dry cough, or productive, also known as a wet cough. A non-productive cough will produce a sputum volume of less than 10 ml per day, while a productive cough will produce a volume of more than 10 ml per day.⁴

Complications

There are a number of complications associated with chronic cough. Patient groups such as infants, the elderly, smokers, immunocompromised patients or patients with comorbidities are also susceptible to complications with chronic cough. Insomnia is often associated with nocturnal cough. Patients can also have issues with urinary incontinence as the coughing action increases pressure within the abdomen, which can cause loss of bladder control. Other potential complications include ruptured blood vessels, headache, vomiting, fractured rib and hoarseness.⁵

Aetiology

The underlying cause of cough can be difficult to ascertain. There are a wide variety of causes of cough and it is important to determine the cause to ensure the correct treatment option is selected. Aetiology can depend if the cough is acute, subacute or chronic.

(i) Acute cough

A patient's medical history alongside a physical examination and specific diagnostic tests may need to be performed to exclude severe illnesses. These illnesses include myocardial infarction, heart failure, pulmonary embolism or pneumothorax as the cause of the acute cough. The most common cause of acute cough is upper respiratory tract viral infections.⁴

Common Cold

The common cold is a viral respiratory infection that can be caused by a variety of viruses including coronaviruses, adenoviruses, rhinoviruses, influenza and parainfluenza viruses. Other symptoms of the common cold include headache, runny nose and sore throat. In the majority of cases, the common cold is self-limiting and resolves within two weeks.⁵

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Influenza

Influenza is another common respiratory virus that has cough as one of the main symptoms. Symptoms of influenza usually present suddenly and other symptoms include high fever, fatigue, muscle pains and headache. Symptoms are usually more severe than the common cold but are usually self-limiting and resolve within two weeks.⁹ Vaccination is the most effective way to protect against influenza.⁷

Covid-19

Covid-19 has been another common cause of cough in recent years, with a non-productive cough commonly reported as an initial symptom. Acute Covid-19-associated cough with other symptoms such as fever, loss of taste and loss of smell is common (60–70% of symptomatic patients). Chronic cough after Covid-19 infection is less frequent but can be observed in post-Covid syndrome, where it is usually associated with symptoms including chronic fatigue, chronic pain, and cognitive impairment.⁸

(ii) Subacute cough

Subacute cough is most commonly a post-infectious cough (PIC). After the acute stages of the viral infection in the upper respiratory tract, there can be inflammation still present in the airways, which can lead to a persistent cough. The chest radiograph findings are generally normal and the cough usually resolves within 8 weeks. If symptoms continue to persist,

it can be a sign of a chronic cough with potentially a different aetiology. A bronchoprovocation test or further investigations may be necessary.⁹

(iii) Chronic cough

Infection is not related to the majority of patients with chronic cough and it can be due to a variety of medical conditions.⁴

Upper Airway Cough Syndrome (UACS)

UACS is also known as postnasal drip and occurs when secretions from the nose drip down the back of the throat. These secretions can irritate the throat and trigger a cough, as well as other symptoms including blocked nose, runny nose, sneezing and a frequent need to clear the throat. The main cause of UACS is most commonly seasonal allergic rhinitis but can also be due to rhinosinusitis and laryngopharyngitis. Some patients may have silent UACS, which occurs when patients become tolerant of other symptoms and only the cough persists.^{4, 10, 11}

Gastroesophageal Reflux Induced Cough (GERC)

GERC is one of the main causes of chronic cough and is a subtype of gastroesophageal reflux disease, that presents with chronic cough as the predominant symptom. Some patients with GERC may have no other symptoms, while some may have classical reflux symptoms. The cough will generally occur after meals, particularly after ingesting acidic or fatty foods,

and is usually non-productive or accompanied by a small amount of mucus. The pathogenesis of GERC is due to reflux triggering the cough by direct effect of acid on the proximal part of the oesophagus or by indirect vagal stimulation of the reflux on distal parts of the oesophagus.¹²

Cough-Variant Asthma (CVA)

CVA is an atypical form of asthma and one of the most common causes of chronic cough. Other symptoms of asthma including dyspnea and wheezing are not observed, with cough as the predominant or sole symptom. The cough is generally severe, non-productive and occurs particularly at night or early morning. It is often triggered by dust, smoke, cold air, odours or other irritants. Approximately 30–40% of patients with CVA will develop typical asthma.⁴

Drug-induced Cough

Drug-induced cough is another potential cause of chronic cough. Drug withdrawal is the best method of relieving drug-induced cough, therefore it can reduce complications of cough and use of additional drugs. Angiotensin-converting enzyme inhibitors (ACEIs) are the most common drugs that have a cough as an adverse reaction. The incidence of ACEI associated cough is estimated at up to 10%, with a higher incidence among elderly patients. Angiotensin receptor blockers (ARBs) can be used as an alternative therapy for patients with intolerance to ACEIs. The

incidence of ARB-associated cough is significantly lower than the incidence of ACEI-associated cough and obtains similar antihypertensive effects. Cough is a potential adverse effect of opioids, with an incidence of opioid-induced cough estimated between 28–66%. Other drugs such as statins, omeprazole, pantoprazole, leflunomide and sitagliptin have cough as a rare adverse reaction. Pharmacists are ideally placed to assess a patient's medication history to see if any medications were initiated recently and discuss with a physician about potentially changing drug therapy if necessary.¹²

Non-Asthmatic Eosinophilic Bronchitis (NAEB)

NAEB is another potential cause of chronic cough. NAEB has characteristics of chronic eosinophilic inflammation of the airway and inflammation of the central airway. It is similar to CVA but the degree of inflammation and level of oxidative stress are lower in patients with NAEB. Patients with NAEB often have concurrent allergic rhinitis.⁴

Other Causes

Chronic bronchitis is a condition where the airways are irritated causing coughing, sometimes with associated mucus. Chronic bronchitis may be diagnosed when a patient has a history of chronic productive cough lasting for longer than 3 months of the year, for at least 2 consecutive years and when other diagnoses have been ruled out. Patients with chronic bronchitis are often current or past smokers. Other factors can include second-hand exposure to smoke or environmental exposure to toxins.⁴

The exact aetiology of psychogenic cough (habitual cough) is unknown, however, it is caused by psychological conditions and is more common in children than adults. It often only occurs during the day, with the cough disappearing when concentrating and sleeping. Other less common causes of chronic cough include lung cancer, chronic heart failure and rheumatoid arthritis.⁴

Diagnosis

A thorough medical history is the first step in the diagnosis of cough. Physical examination, and diagnostic tests can be used to exclude severe disease as the

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cause of acute cough. Most acute coughs are caused by upper respiratory tract viral infections. Diagnosis can be made based on medical history and clinical symptoms in most cases, but viral culture or polymerase chain reaction (PCR) lab techniques can be used if necessary. Cough caused by allergic reactions can be observed for response to treatment or allergen testing can also be carried out if necessary.³ A chronic cough is much more difficult to diagnose and typically requires referral to a pulmonologist. Conditions such as UACS are generally based on medical history, observing treatment response and physical examination if necessary. CVA is similar but a bronchial provocation test can be carried out and response to asthmatic treatment observed. In the case of NAEB, a sputum eosinophil count greater than 2.5% is required for diagnosis. Chest radiography can be carried out to check for abnormalities, with CT scans and pulmonary ventilation function also possible options.⁴

Pharmacists assessment and management of cough

Pharmacists are often a patient's first port of call when they initially develop symptoms. Pharmacists can be involved in screening for warning signs that may require immediate referral to another healthcare professional. Pharmacists are accessible healthcare experts and can be involved in a more systematic approach to arriving at a diagnosis and ensuring the patient receives the right treatment and guidance. If it is a regular patient, pharmacists can check the patient medication record to see if any recently initiated medications are causing a drug-induced cough. Pharmacists can also provide advice and thorough counselling about the use of over the counter (OTC) treatment options.

Medical history

Pharmacists are excellently placed to carry out a full and detailed medical history of the patient. Information that should be collected by the pharmacist includes duration of cough, smoking status, aggravating or relieving factors, use of other medication and occupation. The pharmacist should also get full information on symptoms including if the cough is productive or non-productive, colour and

consistency of sputum, as well as any other associated symptoms. A systemic approach should be used to identify comorbidities, which may be the origin or compounding factor of a cough. Pharmacists can encourage and be involved in helping patients keep a diary of symptoms and triggers of the cough, which can include smoking, air pollution, dust, allergies, acid reflux and medications.¹⁸

Smoking cessation

Smoking is one of the main causes of chronic cough and production of sputum is much higher in smokers than non-smokers.¹⁴ Pharmacists are well-placed to make interventions to help patients with smoking cessation. Motivational interviewing is one tool that can be useful in helping people to stop smoking, which involves counselling that has the objective of helping people explore reasons that they want to quit smoking. This helps people gain confidence in their ability to change behaviours. A pharmacist can use this technique to encourage people to change behaviours, which can lead to improvement in their cough, among other health benefits.¹⁵

Warning signs

When pharmacists are involved in the triage of patients upon initial presentation with symptoms, they can play a vital role in identifying warning signs of cough (as outlined in the table below) and referring when appropriate.¹⁶

Warning Symptoms
Shortness of breath.
Chest pains.
Cough lasting 3 weeks or more.
Pain on inspiration.
Wheezing.
Excessive sputum production.
Haemoptysis.
Systemic symptoms including fever, night sweats and unexplained weight loss.
Weakened immune system due to diabetes or chemotherapy.
Difficulty swallowing when eating or drinking.
Suspected adverse drug reaction.
Change in the nature of the smoker's cough.
Swollen glands.

Treatment

There are a number of OTC treatment options available in Ireland for the treatment of cough, depending on the nature of the cough or the underlying aetiology.

Expectorants and Mucolytics

Expectorants and mucolytics are commonly used to treat productive cough. They exert their effect by increasing the volume of sputum in the airway and decreasing its viscosity, therefore promoting effective coughing and clearance of mucus.¹⁷ Clinical studies have shown the efficacy of expectorants in both acute upper respiratory tract infections and in chronic respiratory conditions, where excess mucus and cough are symptoms.¹⁸ Guaifenesin and Carbocisteine are the two most commonly used expectorants that are available OTC to treat respiratory tract disorders characterised by excessive mucus.

Guaifenesin is licensed for OTC use in children over the age of 6 years and Carbocisteine can be used from 2 years old.^{19, 20} Bromhexine is available on prescription (S1B) as a mucolytic to treat viscous mucous secretions in patients over 2 years old.²¹

Cough Suppressants

Codeine is available OTC in Ireland as an antitussive for an unproductive cough, although use is contraindicated in children below the age of 12 years.²²

Supply of codeine products must be under the personal supervision of a registered pharmacist due to the risk of tolerance, dependence and other potential adverse effects.²³ Codeine was considered the gold standard in the treatment. However, recent controlled studies have demonstrated that codeine is not more effective than placebo in suppressing cough caused by upper respiratory disorders. Codeine does not have a favourable adverse effect profile with potential for dependence, drowsiness, nausea, constipation and respiratory depression. Therefore, the use of codeine in treating cough is no longer recommended.²⁴

Non-opioid antitussives are preferred in the treatment of cough. Dextromethorphan is the most commonly used drug in this class. It lacks the inhibitory effect on the respiratory centre compared to codeine, as well as the analgesic and sedative effects. The most common side effects include nausea, drowsiness and dizziness. Dextromethorphan is well tolerated and has a wide therapeutic window, making it an amenable drug for clinical use. It should not be co-administered with selective serotonin reuptake inhibitors (SSRIs) and monoamine oxidase inhibitors (MAOIs), due to the risk of serotonin syndrome.²⁵ According to studies, a single dose of dextromethorphan hydrobromide has a clear antitussive effect on cough.²⁶ Dextromethorphan is licensed for OTC use in those over 12 years of age for the relief of non-productive and irritating cough.²⁷

Antihistamines are often used in the treatment of cough. Diphenhydramine is a first-generation H1-antihistamine that has been demonstrated to have efficacy in treating cough. It is particularly useful for acute cough caused by the common cold and chronic cough caused by UACS, in particular in combination with a decongestant such as pseudoephedrine. Second generation antihistamine including cetirizine, loratadine and fexofenadine can also be effective in treating UACS.^{28, 29} Side effects associated with diphenhydramine include drowsiness, dry mouth and blurred vision. A cough syrup containing diphenhydramine is licensed for OTC use in Ireland to treat symptoms of non-productive cough in patients aged 6 years or older.³⁰

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Demulcents, natural remedies and supplements for children

Demulcents, such as honey, glycerin and syrup, are used to provide a soothing protective layer over the mucous membrane and to provide some relief from pain and inflammation. One drawback associated with demulcents is that they generally only provide very short-term relief from symptoms.³¹ Honey has been shown to relieve symptoms of cough and to reduce duration of cough when compared to placebo.³² As well as having a demulcent effect, honey has antimicrobial properties, which may explain its effectiveness in treating acute cough. Furthermore, honey is relatively low cost and has an excellent safety profile.³² Honey may also be used for younger patients instead of some other treatment options. Honey can be used from 1 year old, however, it should not be used in infants younger than this due to the risk of infantile botulism.³³

Corticosteroids, β 2 Receptor Agonist and Leukotriene Receptor Antagonists

Corticosteroids, either oral or inhaled, are effective in treating UACS and CVA. The therapeutic principles for CVA are similar to those for asthma. A combination of budesonide or fluticasone with formoterol (β 2 receptor

agonist) for 8 weeks can greatly reduce chronic cough. A short-term oral corticosteroid course (10-20 mg per day for 3-5 days) is recommended for patients not responsive to inhaled corticosteroid therapy, or in patients suffering from severe inflammation of the airway. Oral corticosteroids use does not have a favourable side effect profile and can cause nausea, weight gain, fluid retention, mood swings and adrenal insufficiency. Meanwhile, the main side effects of inhaled corticosteroids include oral thrush and hoarseness. Intranasal corticosteroids including budesonide and fluticasone propionate can be used to effectively treat allergic rhinitis that has caused UACS. Intranasal corticosteroids have a much better side effect profile than oral corticosteroids, however, rare side effects may include nose bleeds or throat irritation. Leukotriene receptor antagonists can be used as add-on therapy in UACS and CVA and are effective in improving cough, airway inflammation and quality of life.⁴

Antibiotics and Antivirals

Most acute coughs are caused by viral infections and antibiotics will not be an effective treatment. In the case of bacterial infection, broad spectrum oral antibiotics such as β -lactams and quinolones

can be used prior to obtaining the culture results before specific antibiotics are chosen based on sensitivity results.⁴ Oseltamivir can be used to treat symptoms of influenza and has shown efficacy when treatment is initiated within two days of symptom onset.³⁴ Paxlovid is indicated for treatment of acute covid-19 if the patient is at risk of progressing to severe covid-19 but does not require supplemental oxygen.³⁵

Complementary Therapies

Herbal medicines are popular in the treatment of minor medical conditions, including coughs. Herbal medicinal products on the Irish market must be either authorised or registered with the HPRA. Effective regulation of herbal medicines is considered necessary in order to ensure that safe products of appropriate quality continue to be available in pharmacies and other outlets.

Some complementary and alternative medicines including eucalyptus, marshmallow, liquorice and thyme are commonly used in treatment of cough. These products can also interact with other medications, which should be taken into consideration.³⁶ It is always important to check with the pharmacist if traditional herbal remedy products for coughs or other illnesses are suitable, and if

there are any contraindications or possible interactions with its use for the individual person.

Non-pharmacological treatments

Some other non-pharmacological therapy options are also available for cough. Patients should be counselled to ensure they drink plenty of fluids and get sufficient sleep. Steam inhalation and drinking warm fluids can help to loosen mucus. Dairy products should be avoided as they can increase viscosity of mucus and alcohol should be avoided as it can impair the immune system.¹⁶

Non-pharmacological treatment options also include breathing techniques and cough suppression, but these would require referral to a physiotherapist or a speech and language therapist.

Other Treatments

Lifestyle modifications such as weight loss, smoking cessation, avoiding acidic food, limiting coffee and alcohol can be effective in the treatment of GERC. Proton pump inhibitor (PPI) treatment can be initiated to determine if the cough resolves or significantly improves. Prokinetic agents such as domperidone can also have a positive effect on GERC.⁴

References available on request

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