

# Cough: a defence mechanism and a symptom

Joseph M Cacciottolo MD, DSc

Department of Medicine, University of Malta Medical School, Malta

E-mail: [joseph.cacciottolo@um.edu.mt](mailto:joseph.cacciottolo@um.edu.mt)

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**Cough is a very frequent reason why patients consult their family doctor and seek advice from the community pharmacist. Together with breathlessness, it is one of the commonest symptoms of lung disease.<sup>1</sup> Cough is not only a symptom, but also a very rapid defence mechanism that both protects and clears the airways. Coughing may also be looked upon as a means of spreading infection via droplets and contamination of objects.**

Coughing may be voluntary but it is usually an involuntary reaction to stimulation of cough receptors in the airways. The cough centre in the medulla oblongata reacts to stimuli arising from receptors in the nose, nasopharynx, tracheobronchial tree, and the pleura. The slightest inhalation of minute amounts of foreign matter is enough to trigger the cough reflex.

The physiology of coughing involves quite a complex sequence. There is first deep inhalation, and a closed glottis seals the air within the lungs. The abdominal and other respiratory muscles contract forcefully, raising pressure within the lungs to over 100mmHg. The vocal cords and epiglottis suddenly open, releasing the air in the lungs at exhalation velocities of over 100km/h.

Complications of coughing are infrequent and are usually mild, such as hoarseness and headaches. Recurrent severe bouts may however lead to such complications as urinary incontinence, disruption of surgical wounds, subconjunctival haemorrhages and rib fractures. Chronic coughing often causes persons to be self-conscious and may affect the quality of life significantly.<sup>2</sup>

The most common cause of acute cough is the common cold and usually subsides without the need for any treatment; other causes are acute sinusitis, pertussis and asthma.<sup>3</sup> Occasionally, acute cough is a symptom of serious disease such as congestive heart failure, pulmonary embolism, pneumonia or inhalation of a foreign body.

Chronic cough may be defined as a cough of more than eight weeks' duration.<sup>4,5</sup> Cigarette smoking is a leading cause of chronic cough and the symptom is directly related to the number of cigarettes smoked per day.<sup>6</sup> About 25% of those who smoke half a packet per day report a chronic cough, and this figure rises to over 50% among those who smoke more than two packets daily. Many smokers accept coughing as normal and may not seek medical attention for a cough that persists. Cough is also an important symptom of lung cancer, a disease predominantly prevalent among smokers. Indeed, a change in the character or pattern of coughing in a smoker should always be thoroughly investigated.

The four most common causes of chronic cough among non-smokers are post-nasal drip, asthma, gastro-oesophageal reflux and post-infectious bronchial infection. Patients with post-nasal drip syndrome also complain of a sensation of something dripping into the throat, a tickle in the throat, hoarseness, nasal congestion and/or discharge. If sinusitis is the cause of post-nasal drip, combined treatment with antibiotics, intranasal corticosteroids and decongestants may

be necessary.<sup>7</sup>

Asthma may cause chronic cough across all age groups and must be considered in the differential diagnosis of most patients presenting with this symptom. When cough is the only symptom of this condition, the term cough-variant asthma is used. Treatment for this form of asthma is the same as for asthma presenting with other symptoms: anti-inflammatory treatment being the mainstay of therapy, and use of bronchodilators for rapid relief.<sup>8</sup>

Gastro-oesophageal reflux (GOR) occurs when acidic stomach contents leak into the oesophagus or higher up. The most likely pathogenesis is stimulation of vagally mediated receptors in the oesophagus, and the actual aspiration of stomach contents causing cough is uncommon. Patients with GOR may complain of chest discomfort and heartburn; however chronic cough may be the only symptom present. Diagnosis of GOR-related cough can be made with certainty when the symptoms respond to anti-reflux therapy.<sup>9</sup>

Chronic inflammation of the airways is an important trigger of persistent cough, and chronic bronchitis due to exposure to tobacco smoke or other respiratory irritants is the commonest cause in this respect; other causes include bronchiectasis. Coughing may persist following acute respiratory tract

infection and is due to ongoing inflammation. This cough eventually resolves, however treatment is often necessary to ease discomfort.

Occasionally, cough occurs as a side-effect of medication and the class of drugs most commonly implicated is angiotensin converting enzyme (ACE) inhibitors. A review of the literature suggests that around 10% of patients treated with an ACE inhibitor may have cough as a side-effect, rapidly resolving when the drug is withdrawn.<sup>10</sup> Treatment with beta-blockers may cause increased airway resistance and consequent provocation of coughing especially among patients suffering from asthma and COPD.

Psychogenic cough occurs more frequently in children; however it has lower rates of resolution among adults. Emotional and psychological problems are the likely causes and this diagnosis can only be made after all other possibilities have been ruled out. Most patients with psychogenic cough neither have this symptom during sleep nor during enjoyable distraction. In some patients, coughing is a nervous tic, occurring only when they become upset or self-conscious.<sup>11</sup>

When coughing is transient, and of a trivial nature, investigations are not necessary and only symptomatic relief is warranted. When the cough becomes chronic, evaluation should begin with a detailed history and a physical

examination initially focusing on the nose, the nasopharynx and the lungs. Easily identifiable causes, such as ACE inhibitor use and exposure to irritant fumes, should be addressed. A chest X-ray should be considered very early in the evaluation process, and more specific tests considered should this be abnormal or if the cough persists. Algorithms for evaluating cough have been drawn by a Consensus Panel of the American College of Chest Physicians and the European Respiratory Society Task Force<sup>5</sup>, and suggest a sequential approach both for immunocompetent and for immunologically-incompetent adults.

When pharmacologic treatment of cough becomes necessary, distinction between anti-tussive therapy and pro-tussive therapy is important.<sup>1</sup> Non-specific cough suppressants such as codeine and dextromethorphan are directed at the symptom and not at the cause. They are indicated when specific therapy cannot be given or when this has not yet treated the cause.<sup>12</sup> They are also given when specific therapy cannot work, as in advanced and inoperable lung cancer.

Coughing is necessary for mucus clearance and this may be facilitated by agents that increase cough effectiveness, often by making expectoration easier. In practice, however, evidence of clinical utility of these agents is not clear.

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