

An overview of post infectious coughs

Samrad Mehrabi

Department of Internal Medicine, Shiraz University of Medical Sciences, Shiraz, Iran.

Abstract

Coughs lasting more than 3 weeks after airway infections are likely regarded as post-infectious coughs. A normal chest radiography unfavors possibility of pulmonary infection. These coughs are self-limited. This study reviews conducted studies in order to identify and define prevalence, pathogenesis, and cure of post-infectious constant coughs. The necessary data and guidelines are gained from English articles in PubMed website. Post-infectious and cough are searched. Post-infectious cough pathogenesis are not known; nevertheless, inflammation, epithelial damages of upper and lower airways, increased mucus secretion, and an increased reactivity of airways can cause these coughs. Despite self-limitedness of these coughs; dextromethorphan, antihistamines, ipratropium bromide, and decongestant are usually prescribed for cure of these coughs. Conversely, antibiotics play no significant role in this regard. These coughs constitutes smaller percentage of chronic coughs and are primarily classified in subacute coughs. Further studies should cover sub-acute and chronic properties of these coughs as well as their prevalence in different age groups and their determinants.

Keywords: Airways, Cough, Post-infectious cough.

1. Introduction

Cough is a protective reflex of airways and lungs, which reduces risks of infection, atelectasis, and aspiration. Cough duration is very significant to identification of its causes (1):(1) acute cough (shorter than three weeks) primarily in cases of infections, aspirations, and stimulative conditions, (2) subacute cough (3-8 weeks) mostly occurs in viral infections; (3) chronic cough (longer than 8 weeks) primarily occurs in inflammatory, neoplasms, and cardiovascular diseases. Most prevalent causes of acute and subacute cough are infectious. Monto and Arbor (1995) and Greenberg (2002) revealed that respiratory infections significantly affect death rate of children and adults (2-3).

2. Pathogenesis

As Lieberman *et al.* (1998) point out, viruses are the most influential causes of respiratory

diseases, by which upper and lower airways are involved. Bacteria can also cause respiratory infections in a lower level of prevalence (4). According to Mackie (2003), there are many viral pathogens that cause acute upper respiratory tract infections and seen in different patients depending on age, season, and geographical region. Until 1960, influenza and measles were known as viral respiratory infections while next widely-conducted studies also revealed rhinoviruses, coronaviruses, adenoviruses, parainfluenza viruses, and respiratory syncytial virus as causes of respiratory tract infections (5). Braman (2006), Zimmerman *et al.* (2000), and Ryan and Gibson (2008) demonstrate that coughs lasting 3 weeks or longer or even several months after primary infections are related to airway infections but their infectious pathogens are hardly identified (6-8).

Persistent cough has variety of pathogenesis and airways inflammation is the main cause. If lower airways get involved in the process of inflammation, the patient coughs due to an increase

Corresponding Author: Samrad Mehrabi, Department of Internal Medicine, Shiraz University of Medical Sciences, Shiraz, Iran.
Email: mehrabis@sums.ac.ir

in mucus secretion and impaired mucus clearance. Upper airway inflammation directly stimulates cough receptors. Cough also may be caused by inflamed sinus secretions that stimulate cough receptors in larynx- and hypopharynx. Gastro pharyngeal reflux caused or worsened by coughs is one of persistent cough pathogenesis. Cough also starts and aggravates with multiple factors such as cigarette smoking, dust, perfumes, chemical gases, and even eating, drinking, laughing, and breathing in cold air. Throat irritation is often reported by patients, which cause bout of coughs (9).

3. Prevalence

As Ryan *et al.* (2012) showed, although symptoms of respiratory infections are usually resolved after control of infection, but sometimes symptoms such as coughs may continue. As such 40% of adults are afflicted with coughs after an incidence of acute airway infections (10). These constant coughs are regarded as 11-25% of chronic coughs. Throat irritation is often reported by patients, which cause regular coughs (9). Kwon *et al.* (2006) revealed occurrence of persistent coughs after respiratory infections in 50% of cases (11). Curley *et al.* (1988) showed that constant coughs that persists 2 weeks or longer occur in 25% cases of cold. Fifty percent of cases of whooping cough and pneumonia are caused by mycoplasma pneumonia (12). In a study on 136 patients attending a pulmonology clinic, 8% of chronic coughs were post-infectious coughs (13). Findings of Ryan *et al.* (2010) during influenza pandemic (2009) on 136 patients demonstrated rate of 43% of post-infectious chronic cough in patients suffering from influenza virus and 36% in cases suffered from non-influenza infection. Influenza-suffering

patients have cough reflex sensitivity nine times greater as compared with patients not being afflicted with post-infectious chronic cough (10).

Cough considered post infectious when a patient complains of cough that lasts greater than 3 weeks but less than 8 weeks after an acute upper respiratory tract infection and chest x-ray is normal (1, 14). The frequency of postinfectious cough has been reported between 11% up to 50% during outbreaks of Mycoplasma pneumoniae and Bordetella pertussis infections (6, 11). H₁N₁ influenza infection is also a risk factor for persistent cough that in one study has been reported in 43% of patients (10). Excessive cough can result in a variety of complications (table 1) (15).

4. Treatment

Irwin *et al.* (2006) and Morice *et al.* (2006) found that as these persistent coughs do not cause great incapability and they ignored by some people. Conversely, educated persons and some others attend clinics for treatment due to their jobs (1, 16). Poe *et al.* (1989) showed that symptomatic treatments including antihistamines, decongestants, ipratropium bromide, and sometimes oral and nasal corticosteroids albeit during a short period are used (17). Braman (2006), Morice *et al.* (2006), and Ryan *et al.* (2010) suggested antihistamines, narcotics, centrally acting coughs suppressants, dextromethorphan, corticosteroids, ipratropium bromide, and bronchodilators for these coughs (6, 10, 16). Nevertheless, these coughs are hardly controlled.

Fujimori *et al.* (1997) followed 22 patients with post-infectious chronic coughs, without any history of smoking cigarettes, taking ACE inhibitors, atopy and sinus diseases. They revealed that

Table 1. Some complications of excessive cough.

Respiratory	Subcutaneous emphysema, pneumomediastinum, pneumothorax, exacerbation of asthma, laryngeal trauma
Cardiovascular	Arterial hypotension, dislodgment/malfunctioning of intravascular catheters, brady and tachyarrhythmias
Gastrointestinal	Gastroesophageal reflux events, Mallory-Weiss tear, splenic rupture, herniations
Neurological	Headache, dizziness, cough syncope, cerebral air embolism, acute cervical radiculopathy, seizures, stroke due to vertebral artery dissection
Genitourinary	Urinary incontinence, inversion of bladder through urethra
Musculoskeletal	Rib fractures, diaphragmatic rupture,
Others	Fear of serious disease, decreased quality of life, disruption of surgical wounds, petechiae and purpura

old women are more likely afflicted with chronic cough and effectively respond to a mixture of dextromethorphan, hydrobromide, oxatomide (H_1 antihistamine) and bakumondoto (a traditional Japanese herbal medicine composed of six herbal components). Nevertheless, they stated that there is a need for standard treatment (18). Fujimori *et al.* (1997) also evaluated the impact of dextromethorphan and oxatomide combination upon cough severity after 5-7 days, as compared with persons taking only one of these medicines. They viewed a combined treatment of dextromethorphan and oxatomide as an effective cure for chronic cough caused by upper airway infections (18). Moreover, these scholars assess a combined treatment of oxatomide, antihistamine, bakumondoto (a Japanese medicine controlling activities of C fibers in patients suffering from constant coughs after upper airway infections). After a three-week treatment, cough severity is reduced by 50%. Accordingly, they introduced this combined treatment as an effective cure for constant coughs (19).

Liu *et al.* (2013) demonstrated in a detailed review that Chinese herbal medicines are more effective in post-infectious coughs as compared with placebos and common Western medicines (20). Wang *et al.* (2014) administered montelukast 10 mg daily and placebo respectively to 127 and 139 patients aged 16-49 years old suffering from post-infectious coughs. They followed patients 2 and 4 weeks later. Their findings suggest that montelukast does not reduce post-infectious coughs (21).

Holmes *et al.* (1992) highlighted significant impact of nasal spray ipratropium bromide (320 mcg/d) upon post-infectious persistent cough control (22).

Different studies have investigated effects of nasal corticosteroids on bronchial sensitivity (23-25). Ewald *et al.* (1989) view low dosage of nasal corticosteroids (400 mcg of beclomethasone once daily) as ineffective in case of non-asthmatic chronic cough (25).

Pornsuriyasak *et al.* (2005) administered either nasal budesonide (400 mcg twice a day) or placebo to 30 patients suffering from persistent

cough during 4 weeks to examine clinical impacts of nasal corticosteroid upon persistent cough after respiratory tract infections. They were followed up in the second and fourth weeks. The findings do not show any significant effect of nasal corticosteroid on persistent cough, relative to placebo (26). Gillissen *et al.* (2007) introduced nasal beclomethasone dipropionate (400 mcg twice a day for 7 days and 200 mcg twice a day during the next 4 days) as an effective cure of post-infectious cough (27). Some uncontrolled studies also suggest a short-term oral prednisone treatment (30-40 mg) in mornings and gradual tapering during 2-3 weeks (17). According to two review studies, due to high prevalence of coughs, their socio-economic burdens, and use of antibiotics, further studies should be conducted for management of post-infectious cough (28-29).

5. Conclusion

While post-infectious coughs last several weeks and months after infections (30), studies on post-infectious persistent coughs and their pathogenesis only have considered coughs lasting between 3 weeks and 8 weeks after infections as post-infectious coughs. A small number of studies have investigated anti-inflammatory medicines in cases of post-infectious persistent coughs. Stimulators of coughs should be identified before treatment due to multiple pathogenetic factors of coughs (increased reactivity of airways, increased mucus secretions, mucociliary system disorders, gastro pharyngeal reflux, *etc.*). The best treatment method is unknown in adults suffering from post-infectious cough which is not caused by bacterial sinusitis and whooping cough. Dextromethorphan, antihistamines, ipratropium bromide, and decongestants are usually administered for treatment of these coughs. Conversely, antibiotics do not play any role in this regard. With regard to different studies on post infectious cough and their cure, further studies on corticosteroids and their role in control of post-infectious coughs would be suggested.

Conflict of Interest

None declared.

6. References

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