Elana Sydney · Eleanor Weinstein
Lisa M. Rucker *Editors*

Handbook of Outpatient Medicine

Springer

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ISBN 978-3-319-68378-2 ISBN 978-3-319-68379-9 (eBook)
https://doi.org/10.1007/978-3-319-68379-9

Library of Congress Control Number: 2017960768

Printed on acid-free paper

This Springer imprint is published by Springer Nature
The registered company is Springer International Publishing AG
The registered company address is: Gewerbestrasse 11, 6330 Cham, Switzerland

Preface

The practice of medicine in the outpatient setting has become increasingly complex and challenging in recent years. Pressures of time and of decision making regarding patients with multiple comorbidities may test even the most-seasoned clinicians. The busy clinician needs an easy-to-use, quick reference that can help guide assessments and therapeutic plans on the spot. As practicing general internists and teachers for decades, we know too well how critical it is to have a clear idea quickly about how to approach the patient sitting across from you in the exam room. Our goal was to provide such a roadmap for the common problems that present themselves to the outpatient adult provider.

This book is organized into two main sections. The first section deals with the approach to special populations, such as the older adult and the teen with chronic medical problems transitioning to adult care. The second section focuses on specific symptoms, diagnoses, and organ systems. Each chapter includes an algorithm to efficiently guide the user along the decision points of making the diagnosis and/or determining the best treatment. The sections are written by experienced outpatient clinicians and based on current evidence and up-to-date recommendations by respected organizations such as the US Preventive Services Task Force.

Quotidian topics like diabetes and hypertension are presented in more detail. Other common issues less commonly included in textbooks are covered here as well. These topics include obesity, sleep apnea, and hair loss. Although this book is certainly not intended to be an exhaustive compendium of medicine, it does address most of the diagnoses and chief complaints presented to an outpatient medicine practitioner. Additionally, the approach to diagnosis and treatment represents a variety of medical centers across the country as well as internationally.

Written and organized in an easy-to-follow style, this book can aid physicians, medical students, nurse practitioners, and physician assistants. We hope you find this reference to be useful.

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Abbreviations

A1c	Hemoglobin A1c
AC	Acromioclavicular
ABRS	Acute bacterial rhinosinusitis
AIN	Acute interstitial nephritis
AKI	Acute kidney injury
ARS	Acute rhinosinusitis
ATN	Acute tubular necrosis
AGIs	Alpha-glucosidase inhibitors
ACC	American College of Cardiology
AHA	American Heart Association
ARBs	Angiotensin receptor blockers
ACEIs	Angiotensin-converting enzyme inhibitors
AHI	Apnea-Hypopnea index
AVM	Arteriovenous malformation
ASA	Aspirin
ASCVD	Atherosclerotic cardiovascular disease
BPH	Benign prostate hypertrophy
BDZRA	Benzodiazepine Receptor Agonist
CURB 65	Confusion, Uremia, Respiratory distress, Blood pressure<90/60, age 65
CVD	Cardiovascular Disease
CSA	Central Sleep Apnea
CXR	Chest X ray

CDH	Chronic daily headache
CKD	Chronic kidney disease
CVT	Chronic venous thrombosis
CBT	Cognitive behavioral therapy
CI	Confidence interval
CAD	Coronary artery disease
CP	Chest pain
DVT	Deep vein thrombosis
DM	Diabetes mellitus
DPP-4	Dipeptidyl peptidase 4
ER	Emergency room
ESRD	End-stage renal disease
FENa	Fractional excretion of sodium
FeUrea	Fractional excretion of urea
GERD	Gastroesophageal reflux disease
GFR	Glomerular filtration rate
GAS	Group A Streptococcus
HC	Hemicranias continua
HTN	Hypertension
HRS	Hepatorenal syndrome
HDL-c	High-density lipoprotein cholesterol
H&P	History and physical
HIV	Human immunodeficiency virus
IV	Intravenous access
IVFs	Intravenous fluids
LFTs	Liver function tests
LDL-c	Low-density lipoprotein cholesterol
LP	Lumbar puncture
MO	Medication overuse
NSF	Nephrogenic systemic fibrosis
NSAIDs	Non-steroidal anti-inflammatory drugs
NTG	Nitroglycerin
OHS	Obesity hypoventilation syndrome
OSAHS	Obstructive sleep apnea/hypopnea syndrome
OCST	Out of center sleep testing
O_2	Oxygen
PH	Paroxysmal hemicranias
PICC	Peripherally inserted central catheters

PSG	Polysomnography
PAP	Positive airway pressure
PPIs	Proton pump inhibitors
PE	Pulmonary embolism
ROM	Range of motion
RADT	Rapid antigen detection testing
RBCs	Red blood cells
RR	Relative risk
SUNCT	Short lasting unilateral neuralgiform headache
SDB	Sleep disordered breathing
SGLT-2	Sodium-glucose transporter 2
SNP	Split night polysomnography
SAH	Subarachnoid hemorrhage
SDH	Subdural hematoma
SVC	Superior vena cava
TMJ	Temporal mandibular joint
TTH	Tension-type headache
TZD	Thiazolidinediones
TSH	Thyroid stimulating hormone
TTE	Transthoracic echo
TAC	Trigeminal autonomic cephalalgia
T1D	Type 1 diabetes
T2D	Type 2 diabetes
US	Ultrasound
UA	Urinalysis
USPSTF	US preventive services task force
VLDL-c	Very low-density lipoprotein cholesterol
WBCs	White blood cells

Part I
General Considerations

Chapter 10
Cough

Israa Soghier and Kiyoshi Kinjo

Introduction

Cough is one of the most common presentations to both primary and secondary care providers. In most cases, the cause of cough can be identified with history, physical examination, and simple diagnostic tests. Sometimes chronic cough can be challenging to diagnose and treat and will require referral to a specialist.

Decision-Making/Differential Diagnosis

Cough can be divided into acute, subacute, and chronic based on the duration of the symptom. Acute cough exists for less than 3 weeks, while chronic cough persists more than 8 weeks [1]. Acute cough is most commonly caused by upper

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E. Sydney et al. (eds.), *Handbook of Outpatient Medicine*,
https://doi.org/10.1007/978-3-319-68379-9_10

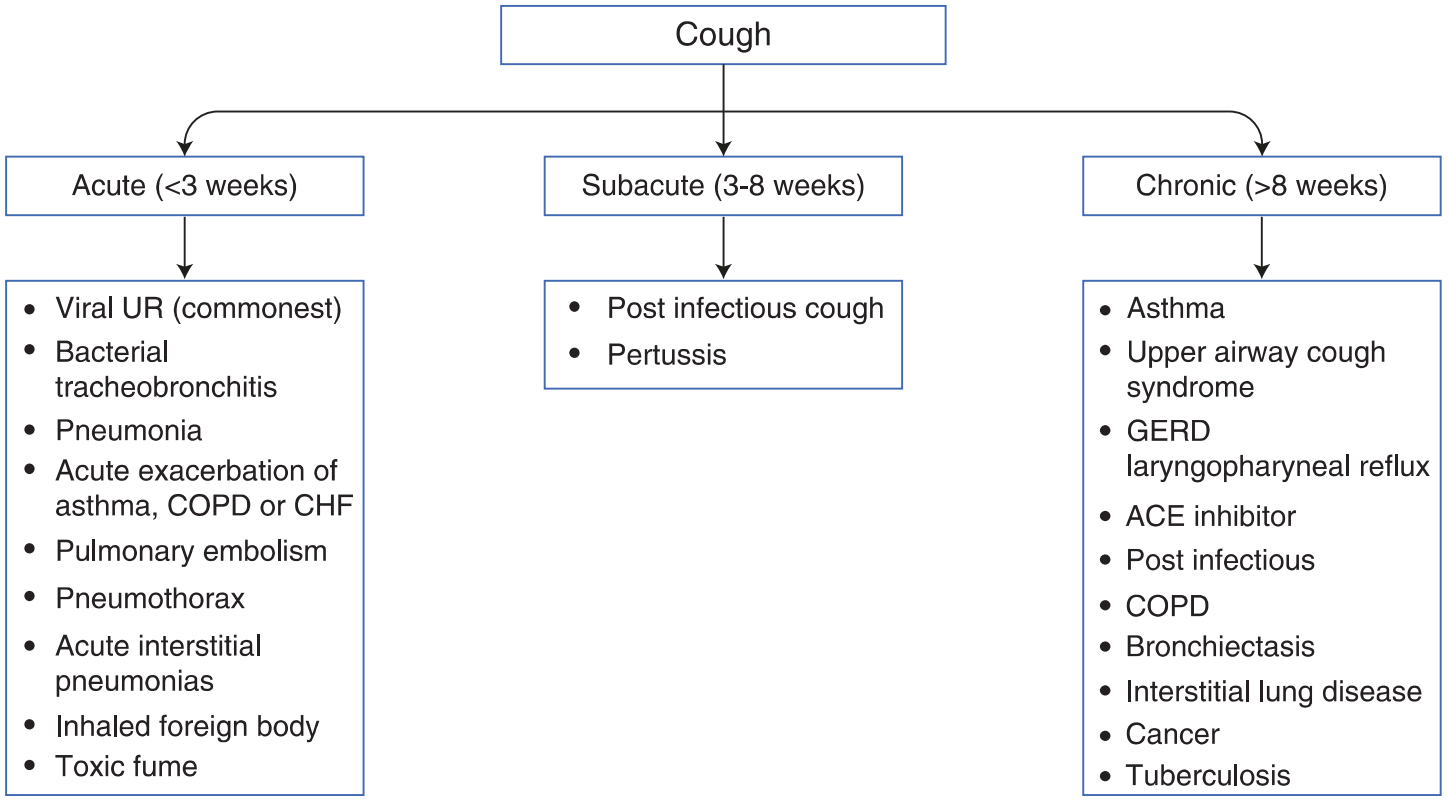

FIG. 10.1 Differential diagnosis of cough

respiratory infections. Other causes include pneumonia, bacterial tracheobronchitis, acute exacerbation of asthma, chronic obstructive pulmonary disease (COPD), congestive heart failure (CHF), and pulmonary embolism (PE). It can also be an early presentation of chronic cough.

Subacute cough is most often due to postinfectious cough. *Bordetella pertussis* may play a significant role. Other etiologies overlap with chronic cough.

Chronic cough should be evaluated with a stepwise approach. After excluding the serious and obvious causes, diagnostic work-up should focus on asthma, gastroesophageal reflux disease (GERD), and rhinosinusitis (Fig. 10.1). More than one condition was found to be contributing to the persistence of chronic cough in up to 62% of patients [1].

Key History and Physical Exam

History taking should focus on the onset, duration of the cough, and presence of associated symptoms like postnasal drip, wheezing, dyspnea, and heartburn. One study suggested that the characteristics and timing of the cough are not usually helpful [2]. Significant sputum production points to an underlying pulmonary disease, e.g., bronchiectasis. Many patients report cough starting after an upper respiratory tract infection. Searching for triggers/aggravating factors including exposures, both at home and at work, tobacco use, and drugs may help identify the etiology. A history of past respiratory or heart disease should be elicited. A family history of cough can be seen in atopic patients and in those with an anatomic or neurological abnormality [3].

Acute cough is relatively easy to evaluate. When a patient presents with cough accompanied by fever, rhinorrhea, malaise, and myalgia/arthralgia with history of a sick contact and he/she looks relatively healthy, the likely diagnosis is upper respiratory infection.

Influenza has similar symptoms but is usually more severe and can only be differentiated from viruses causing common cold by specific testing. It can cause serious complications such

Table 10.1 CURB-65 score

*C*onfusion
*U*rea >20 mg/dL
*R*espiratory rate >=30 breaths/min
*B*lood pressure (systolic <90 mmHg or diastolic =<60 mmHg)
Age >=65 years
1 point is assigned per criterion
0–1 points: risk of death <3%. Treat as outpatient
2 points: risk of death 9%. Consider hospitalization
≥3 points: risk of death 15–40%. Hospitalize and consider intensive care admission especially if 4 or 5 points

as pneumonia, acute respiratory distress syndrome, multi-organ failure, and death. Certain patients are more susceptible to poor outcomes, specifically elderly patients (>65 years) and those with chronic diseases like diabetes, heart failure, chronic pulmonary diseases including asthma and COPD, renal failure, cancer, immunosuppressive conditions, e.g., HIV, and those receiving immunosuppressive drugs [4].

The most important differential diagnosis is pneumonia. Pneumonia is usually not accompanied by rhinorrhea or other upper respiratory symptoms. Purulent sputum is commonly seen in pneumonia, but purulence is not specific to pneumonia (sinusitis and bronchitis can be also associated with purulent sputum). "Atypical pneumonia" presents often with a dry cough. Bronchial breathing or crackles can be present when auscultating the chest.

The Infectious Diseases Society of America (IDSA) and the American Thoracic Society (ATS) recommend using a prediction score, either the CURB-65 score (Table 10.1) [5] or the pneumonia severity index (PSI) (Table 10.2) [6], to determine whether the patient can be treated as an outpatient or requires hospitalization [7]. The CURB-65 score is less well validated than the PSI but is easier to calculate [8]. Implementing the PSI results in fewer admissions without an

TABLE 10.2 Pneumonia severity index (PSI)

Sex
M (0 points)
F (−10 points)
Demographic factors
Age (1 point for each year)
Nursing home resident (10 points)
Comorbid illness
Neoplastic disease (30 points)
Chronic liver disease (20 points)
Heart failure (10 points)
Cerebrovascular disease (10 points)
Chronic renal disease (10 points)
Physical exam findings
Altered mental status (20 points)
Respiratory rate ≥30/min (20 points)
Systolic blood pressure <90 mmHg (20 points)
Temperature <35 °C (95 °F) or ≥40 °C (104 °F) (15 points)
Pulse ≥125/min (10 points)
Laboratory and radiographic findings
Arterial pH <7.35 (30 points)
Blood urea nitrogen ≥30 mg/dL (20 points)
Sodium <130 mEq/L (20 points)
Glucose ≥250 mg/dL (10 points)
Hematocrit <30% (10 points)
Partial pressure of arterial oxygen <60 mmHg or oxygen saturation <90% (10 points)

(continued)

Table 10.2 (continued)

Pleural effusion (10 points)				
Score	*Risk class*	*Risk*	*Mortality rate (%)*	
≤50 years + no points	I	Low	0.1	Outpatient
≤70	II	Low	0.6	
71–90	III	Low	0.9	Outpatient or short hospitalization
91–130	IV	Moderate	9.3	Hospital
≥130	V	High	27	

Table 10.3 Differentiation among asthma, COPD, and CHF exacerbation

	Asthma	**COPD**	**CHF**
Cough	Dry/scant sputum	Purulent sputum	Frothy pink sputum
Orthopnea	+	+	+
Night symptom	Late night to early morning		Early night
Leg edema	–	–	Often
Weight gain	–	–	+

increase in adverse events [9]. Other factors should also be taken into consideration, e.g., the ability to reliably take oral medications, the patient's functional status, other comorbidities, and their social situation. Obtaining routine diagnostic tests to identify an etiologic diagnosis, e.g., blood and sputum culture, is optional for patients with community acquired pneumonia treated at home due to their low yield and small impact on clinical care [7].

Patients who are candidates for outpatient therapy and have no major comorbidities (chronic heart or lung disease,

diabetes, liver or renal disease, alcoholism, cancer, asplenia, or immunosuppression) and who have not taken antibiotics in the previous 3 months can be treated with macrolides or doxycycline. If there is a high incidence (>25%) of drug-resistant *Streptococcus pneumoniae* (DRSP) or if the patient has major comorbidities, a respiratory fluoroquinolone or a beta-lactam antibiotic (high-dose amoxicillin or amoxicillin-clavulanate is preferred; alternatives include ceftriaxone, cefpodoxime, and cefuroxime) plus either a macrolide or doxycycline is recommended [7]. The duration of treatment is a minimum of 5 days.

Acute exacerbation of asthma, COPD, or CHF is relatively easy to diagnose based on history, physical examination, and chest radiograph. All three can present with cough with dyspnea, orthopnea, and wheeze. Asthma tends to produce little sputum, while COPD exacerbation is associated with sputum (often purulent) and CHF with pink frothy sputum. Patients with asthma tend to get worse very early in the morning (Table 10.3).

The clinical presentation of PE is variable, but patients rarely present only with cough; patients also frequently complain of sudden onset dyspnea, pleuritic chest pain, hemoptysis, syncope, and symptoms of deep vein thrombosis (leg swelling and pain). Pulmonary embolism should always be included in the differential diagnosis in patients with risk factors, but these patients tend to be sicker and therefore more often visit emergency rooms rather than the outpatient office.

Other etiologies of acute cough include pneumothorax (sudden onset chest pain, dyspnea), some types of interstitial pneumonia such as acute interstitial pneumonia and hypersensitivity pneumonitis (dry cough with dyspnea), and pleural effusion (chest pain and dyspnea). The history should also reveal the presence of a foreign body or inhalation injury.

The most frequent cause of subacute cough is postinfectious cough. Severity of cough is quite variable and can be disabling in some cases (e.g., sleep disturbance, stress incontinence, post-tussive vomiting). In most cases, the patient recalls a preceding episode of fever and upper respiratory symptoms. Some report persistent nasal symptoms indicating

postnasal drip as a mechanism of cough, while severe whooping paroxysmal cough spells might suggest pertussis. Pertussis can be diagnosed by nasopharyngeal culture, polymerase chain reaction (PCR), and serology. It is important to determine the vaccination status and whether there is a possible exposure to young children to identify pertussis, where early treatment may be helpful [10].

Chronic cough is more prevalent in middle-aged females. Women have more frequent cough than men and have heightened cough reflex sensitivity. Chronic cough should be approached systematically. In up to 93% of patients, an etiology can be found [11].

The first step is to rule out the serious causes and the most common ones by history, physical examination, chest X-ray, and spirometry. The presence of weight loss, fever, night sweats, chest pain, and hemoptysis suggests serious diseases including lung cancer and tuberculosis [3]. Further work-up including sputum testing and chest computed tomography (CT) should be considered. Drug-induced cough, especially due to angiotensin-converting enzyme (ACE) inhibitors, is common (about 15%) [12] usually producing little sputum. It usually starts within 1–2 weeks after the initiation of ACE inhibitors but can be delayed up to 6 months. The cough subsides when the drug is discontinued usually within 4 weeks [13].

Bronchiectasis, COPD, and various parenchymal lung diseases can be identified by chest imaging and spirometry. Patients often have exertional dyspnea which can go unnoticed because they think it is from their smoking, so it is helpful to ask family about the patient's exercise capacity.

Localized or unilateral wheezing may suggest an endobronchial lesion (cancer or foreign body); chest CT should be ordered. The patient should be referred to a pulmonologist for bronchoscopy.

Once the obvious or serious causes are excluded, the three most frequent etiologies of chronic cough are (1) asthma, (2) GERD, and (3) rhinosinusitis [3, 14, 15]. These three conditions may present with cough and typical symptoms, but many patients have only cough; thus empirical (diagnostic) treatment is tried in many cases before an extensive work-up is undertaken (Fig. 10.2).

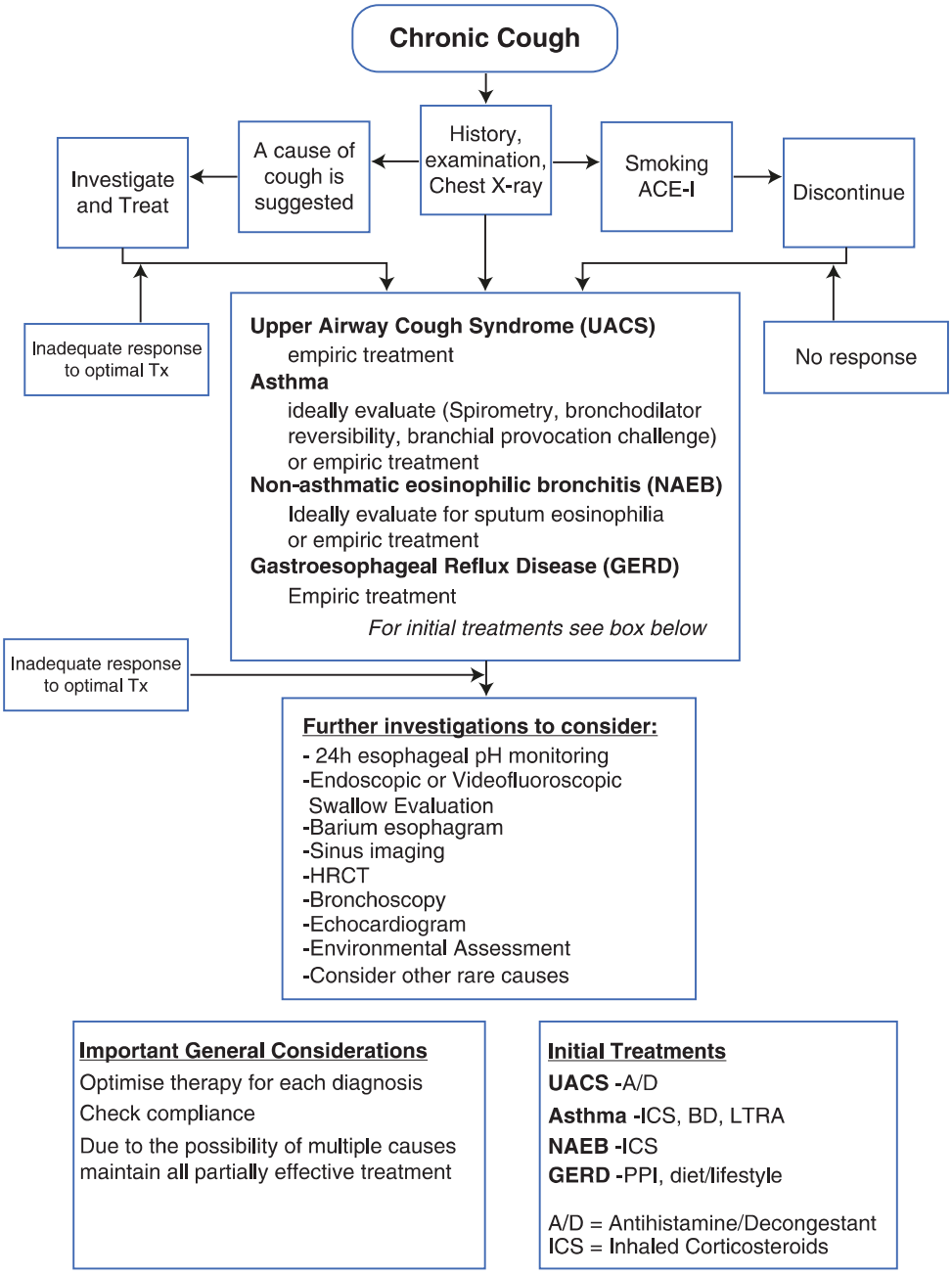

FIG. 10.2 Chronic cough algorithm for the management of patients ≥15 years of age with cough lasting >8 weeks. *ACE-I* ACE inhibitor, *BD* bronchodilator, *LTRA* leukotriene receptor antagonist, *PPI* proton pump inhibitor (Modified from Chest. 2006 Jan; 129(1 Suppl): 1S–23S. Irwin RS, Baumann MH, Bosler DC, et al. Diagnosis and management of cough executive summary: ACCP evidence-based clinical practice guidelines)

Asthma usually presents with episodic dyspnea and wheezing in addition to cough. Occasionally, cough can be the only symptom, an entity known as "cough variant asthma." A personal or family history of atopy or recent initiation of a beta-blocker can be helpful. Spirometry showing reversible airway obstruction is often seen in asthma. If the pulmonary function test is normal, a methacholine challenge test, sputum eosinophils, or elevated exhaled nitric oxide (NO) may assist diagnosis. It is important to try to identify possible triggers/allergens and encourage avoidance. Empiric treatment with inhaled steroids can be tried. Some patients may require oral glucocorticoids for 1–2 weeks [16]. Non-asthmatic eosinophilic bronchitis is difficult to distinguish from asthma clinically. Sputum eosinophilia without bronchial hyperresponsiveness is diagnostic [3].

If the patient with chronic cough has GERD symptoms, proton pump inhibitors (PPI) should be given. Empiric trial with PPI for chronic cough in the absence of GERD symptoms is controversial, and the evidence is lacking [14]. Twenty-four hour esophageal pH monitoring correlates well with cough but does not predict a response to treatment [14]. It may be indicated in patients who have failed to respond to empiric treatment and when the diagnosis is in doubt.

Patients with upper airway cough syndrome have nasal discharge, a sense of postnasal drip, or the urge to clear their throat leading to cough. Cobblestone appearance and secretions may be seen in the nasopharynx. Treatment with nasal steroids or antihistamines is recommended, especially for patients with a history of allergic rhinitis or chronic sinusitis. Saline nasal irrigation can be tried.

Uncommon causes of chronic cough include sleep apnea, chronic aspiration, recurrent tonsillitis, external ear canal processes (e.g., earwax impaction), and psychogenic. When the diagnosis remains unclear, referral to specialists (pulmonary, otolaryngology, or gastroenterology) should be considered.

Treatment

Once the etiology is found, the specific treatment can be instituted. Acute cough is usually self-limited and requires only reassurance. Patients have reported relief from the use of over-the-counter medications, e.g., dextromethorphan, menthol, and first-generation antihistamines [3]. There is no role for antibiotics except in pertussis where macrolides may decrease the duration of cough if initiated within the first 2 weeks of symptoms [10]. When influenza is suspected, treatment with antivirals should be initiated preferably within 48 h in patients who are very ill or at high risk for serious influenza-associated complications. Antiviral drugs have proven to reduce the duration of illness, ameliorate symptoms, and prevent serious complications and death [17].

As noted above, patients with chronic cough are treated empirically in many cases, but the evidence is weak, and the response rates are not perfect, creating frustration for both clinicians and patients. Symptomatic relief by antitussive medications is often suboptimal.

Clinical Pearls

- Cough should be approached based on the duration of the symptom.
- A thorough history and physical exam should give clues to the correct diagnosis in many cases.
- When patient presents with chronic cough and no other obvious symptoms, asthma, GERD, and rhinosinusitis should be considered.

Don't Miss This!

- Many serious diseases such as COPD, lung cancer, interstitial pneumonia, and tuberculosis present with cough. These should be excluded by history, physical examination, chest X-ray, and spirometry, before thinking about asthma, GERD, and rhinosinusitis.
- Weight loss, fever, night sweats, and hemoptysis suggest a serious disease like tuberculosis or cancer. Order a chest X-ray/CT and sputum for acid-fast bacilli.

- Unilateral wheezing suggests an endobronchial lesion, e.g., cancer or foreign body. Order a chest CT and refer to a pulmonologist for bronchoscopy.

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