



PULMONOLOGY

Know and understand:

- How to evaluate common respiratory symptoms: dyspnea, chronic cough, and wheezing
- The 5 A's of helping patients to quit smoking
- How to recognize and treat the major pulmonary diseases and disorders in older patients

- Age-related Pulmonary Changes
- Common Respiratory Symptoms and Complaints
- Major Pulmonary Diseases in Older People

AGE-RELATED PULMONARY CHANGES

- Reduced airway size
- Shallow alveolar sacs
- Reduced chest wall compliance
- Intercostal muscle atrophy
- Reduction in diaphragmatic strength by 25%

DIFFICULTIES IN RECOGNIZING RESPIRATORY SYMPTOMS

- A common misperception is that older people tend to overestimate or exaggerate respiratory symptoms —the opposite is more often true
- Older people often have more than one cause of their problems
 - Dyspnea, cough, and wheezing may overlap
 - The causes may include a combination of diseases such as asthma or emphysema, obstructive sleep apnea, heart failure, and GERD

- Approaches to diagnosis, treatment do not differ with age
- Treat **bacterial rhinosinusitis** with analgesics, saline irrigation, and antibiotics if symptoms ≥ 7 days or worsen
 - But early antibiotics in mild disease can be harmful
- Treat **chronic rhinosinusitis** with topical nasal steroids and saline irrigation
- Treat **allergic rhinosinusitis** by recommending avoidance of inciting allergens and/or with topical nasal steroids and anti-allergy medications

- **Common causes:** COPD, cardiac disease, asthma, interstitial lung disease, deconditioning
- **Does not necessarily correlate** with oxygenation or pulmonary function tests but is the best predictor of QOL
- **Thorough H & P** can help tailor testing and empirical treatment choices
- **Patient's description** can be revealing
 - “Heavy” may imply cardiac dysfunction or deconditioning
 - “Tight” may imply angina or asthma

CHRONIC COUGH

- Usually has a benign cause in individuals without a history of chronic lung disease or smoking
- The most common causes are postnasal drip, asthma, and GERD
- A reasonable approach is empiric treatment for these conditions
- A combination of these conditions may contribute, so treatment for multiple causes may be warranted when single therapies are ineffective
- Consider possibility of silent aspiration, especially in those with frequent pneumonias, neurologic deficits, or residence in extended-care facilities

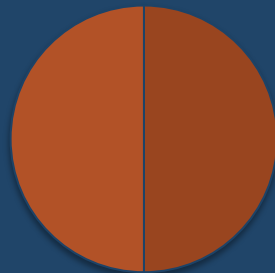
WHEEZING

- Although asthma is a common cause of wheezing in all age groups, it is not the principal cause in older adults, particularly if the wheezing is not associated with cough or dyspnea.
- Common causes in older adults include:
 - COPD
 - Heart failure
 - Postnasal drip
 - Uncontrolled GERD
- “Cardiac asthma” refers to wheezing arising from heart failure

MAJOR PULMONARY DISEASES IN OLDER PEOPLE

- Asthma
- COPD
- Obstructive sleep apnea
- Idiopathic pulmonary fibrosis
- Venous thromboembolic disease
- Pneumonia
- Lung cancer

- After childhood, prevalence of asthma peaks again after age 65 (**late-onset asthma**)
- **5%–10% of people ≥ 65 years**, particularly nonsmokers, meet the criteria for airway obstruction and bronchial hyperreactivity
- Asthma is under-recognized, undertreated in older adults



>50% of all asthma deaths
are in people ≥ 65

- Unlike younger adults, who may need only symptomatic treatment, most older adults require continual treatment programs to control their disease
 - However, overall asthma management does not differ between young and old
- ICS or other controller drugs, such as LTRAs, are the mainstay of therapy
- Use β -agonists as needed as reliever medication
 - Use of long-acting β -agonists is helpful for long-term maintenance therapy and nocturnal symptoms

- **Anticholinergics** can be considered in patients who cannot tolerate β -agonists
- **Biologic agents (eg, omalizumab)** can be used as an adjunct therapy for uncontrolled severe asthma despite maximal inhaler regimens in older asthma patients with increased IgE levels
- **Theophylline** is third-line – fraught with adverse events and drug interactions
- Consider an **asthma action plan**

- Affects 12.7-14.7 million people in the US
- **3rd most common cause of death** after heart disease and cancer
- **Prevalence and mortality rate are increasing**, especially in older people
- COPD is a **leading cause of hospitalization** in the US
 - Accounts for 19.9% of total hospitalizations for patients 65–75 years old
 - Accounts for 18.2% of total hospitalizations for patients >75 years old

- In smokers, chronic cough is the most commonly reported symptom associated with COPD diagnosis
- Wheezing = best predictor of airflow limitation
 - Patients with obstructive airflow limitation are 36 times more likely to have wheezing than are patients without this problem
- Other predictors:
 - Barrel-shaped chest
 - Hyperresonance on percussion
 - Forced expiratory time > 9 seconds measured during a clinical bedside examination

GOLD GUIDELINES FOR COPD

Key Factors for Considering a Diagnosis of COPD

Dyspnea	Progressive or worsens over time; worse with exercise; persistent (present daily); described as “increased effort to breathe,” “heaviness,” “air hunger,” “gasping”
Chronic cough	May be intermittent and nonproductive
Sputum production	Any pattern of chronic sputum production can indicate COPD
Risk factors	Tobacco smoke; occupational dusts and chemicals; smoke from home cooking and heating fuel; family history, genetic variant (α 1-antitrypsin deficiency)
Spirometric Classification of Airflow Obstruction in COPD (Post-Bronchodilator FEV_1) $FEV_1/FVC < 70\%$ applies to each category	
Mild	$FEV_1 \geq 80\%$ predicted
Moderate	$50\% \leq FEV_1 < 80\%$ predicted
Severe	$30\% \leq FEV_1 < 50\%$ predicted
Very severe	$FEV_1 < 30\%$ predicted or $FEV_1 < 50\%$ predicted and chronic respiratory failure

The “Five As” (Agency for Health Care Policy and Research):

- **Ask** patients about use of tobacco at every office visit
- **Assess** readiness to quit
- **Advise** patients to quit
- **Assist** patients in the quit attempt with aids such as a local cessation program and pharmacologic agents such as bupropion, nicotine replacement, or varenicline
- **Arrange** both a quit date and a follow-up visit or contact to discuss the quit attempt

- β -agonist, ipratropium or tiotropium, or both in combination
- For more severe disease, long-acting anticholinergic tiotropium with albuterol-only rescue inhalers or long-acting β -agonists such as salmeterol can achieve long-term control
- Combination therapy with inhaled corticosteroids and a long-acting β -agonist has been associated with better lung function and symptom control but not survival benefit

- Subset of patients with recalcitrant COPD may benefit from additional treatments:
 - Phosphodiesterase-4 inhibitors, such as roflumilast
 - Prophylactic antibiotics
 - Theophylline
 - Chronic systemic steroids
- Proper use of PEF meters and inhalers
 - Neurologic, muscular and arthritic diseases can lead to improper use
 - Clinicians should observe patients actually using the inhaler

- Oxygen therapy
- Pulmonary rehab via exercise training
- Respiratory therapy and education
- Screening and treatment for major depression and anxiety
 - Present in 40% of COPD patients
- **Palliative care consultation in refractory dyspnea**
 - **Stream of air from electric fan**
 - **Low-dose oral opiates**

- Consider diagnosis in patients with daytime somnolence or frequent napping, drowsiness while driving, or snoring or witnessed apneas or hypopneas
- Life-threatening, yet potentially treatable
- Associated with:
 - Stroke
 - Myocardial infarction
 - 3× increase in mortality
 - Significant cognitive impairment
 - Depression
- Often undiagnosed and therefore untreated

TREATMENT OPTIONS FOR SLEEP APNEA

- Weight loss
- Avoidance of alcohol and sedatives
- Sleeping on one's side or upright
- Correction of metabolic disorders such as hypothyroidism
- Continuous positive airway pressure (CPAP) via a nasal mask

- Relentlessly progressive: median survival 3–5 years
- Normal presentation: insidious dyspnea, nonproductive cough, with dry inspiratory rales on exam
 - Clubbing is often a prominent finding in IPF and not in emphysema
- In the past, commonly treated initially with OCS, but only 10%–20% of patients respond and adverse events are often prominent
- **Early referral to a subspecialist is warranted** if the patient wishes to consider further therapy

- Incidence triples from age 65 to age 90
 - Due to age-related risk factors including changes in the hemostatic system predisposing to thrombosis; venous stasis related to illness, injuries, or immobility; incompetence of superficial and deep veins; systemic illnesses associated with thrombogenesis
- Age > 70 is a risk factor for *missed* diagnosis
- Risk factors for VTE:
 - Age >60, indwelling central venous catheter, surgery, trauma, chronic lung disease, dehydration, history of VTE, first-degree relative with VTE, increased fibrinogen level, activated protein-C resistance due to factor-V Leiden gene mutation, IBD, obesity, RA, medications

- Symptoms and signs of VTE are similar in older and younger patients
 - Most patients are asymptomatic
- Physical examination findings:
 - Limb pain, tenderness, warmth, edema
- Testing:
 - D-dimer (upper limit of normal increases with age; age in years x 10)
 - Noninvasive tests: upper and lower extremity venous Doppler examinations, impedance plethysmography, CT of legs, rarely contrast venography
 - Ventilation/perfusion lung scanning, spiral CT of the chest
 - Pulmonary angiography

- Same for older and younger adults
 - In older patients it may be even more important to achieve therapeutic levels of anticoagulation quickly
- Mainstay of initial therapy includes one of:
 - Full-dose LMWH adjusted for weight and renal function
 - Subcutaneous fondaparinux adjusted for weight and renal function
 - IV UFH to maintain aPTT 50-70 seconds
 - Oral factor Xa inhibitors apixaban, rivaroxaban, or edoxaban
- Long-term therapy for VTE may include:
 - Warfarin, LMWH, apixaban, rivaroxaban, or edoxaban, or the direct thrombin inhibitor dabigatran

VENOUS THROMBOEMBOLISM (VTE): ANTICOAGULATION DURATION

- Long-term anticoagulation (≥ 6 months) is preferred to shorter term (eg, 3 months) unless there are increased risks of bleeding
- Patients with multiple ongoing risk factor for VTE may be consider for anticoagulation therapy for up to 2 years or longer
- Recurrent VTE is usually treated with lifelong anticoagulation therapy

- With age, there is a decline in forced vital capacity, FEV₁, and PaO₂, while the A-a gradient increases
- Clinically significant dyspnea is often under-reported and unrecognized in older adults
- 5%–10% of people ≥65 years meet criteria for asthma
- COPD is the third leading cause of death in older adults; pharmacologic treatment chiefly consists of inhaled bronchodilators and steroids
- Smoking cessation will slow the decline in lung function at any age

- A 72-year-old woman has had shortness of breath with exertion for several months.
 - She has an intermittent dry cough that sometimes awakens her at night.
- History: hypertension
 - She is a former smoker.
- Examination
 - Blood pressure 132/74 mmHg, pulse 75 bpm, respiratory rate 16 bpm
 - O₂ saturation 97% on room air
 - Lungs have decreased air entry with faint end-expiratory wheezing bilaterally.
 - No increase in jugular venous pressure
 - Normal cardiac findings
 - No pedal edema or clubbing

- Radiography
 - Chest x-ray: no infiltrates or lung hyperinflation
 - Echocardiography: normal left ventricular ejection fraction with reversal of E:A ratio
- Pulmonary function tests
 - FEV1 (forced expiratory volume in first second of expiration): 55%
 - FEV1 to FVC (forced vital capacity) ratio: 65%
 - With bronchodilators, FEV1 improves by 24% (220 mL)
- An inhaled short-acting β 2-agonist is prescribed, 4 times daily as needed.
 - At follow-up, the patient reports symptoms, usually with exertion, 3 days/wk, and night-time awakening 1 night/wk

Which one of the following would be the best therapy to add?

- A. Inhaled long-acting β 2-agonist
- B. Inhaled short-acting anticholinergic agent
- C. Inhaled corticosteroid
- D. Leukotriene receptor antagonist

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