Module 9. Respiratory Diseases

EDUCATIONAL OBJECTIVES

Upon completion of this activity, participants will be better able to:

1. Discuss the epidemiology and pathophysiology of common respiratory disorders;
2. Explain the basic approach to treatment for common respiratory disorders;
3. Discuss appropriate monitoring parameters for respiratory medications discussed in this module; and
4. Demonstrate effective patient counseling skills for patients with a respiratory disorder discussed in this module.

POST-TEST/RATIONALE

1. Which of the following respiratory disorders is projected to increase in rank as a leading cause of death?
   
   A. asthma  
   B. chronic obstructive pulmonary disease***  
   C. pulmonary hypertension  
   D. chronic bronchitis

   **Correct answer: B**  
   Chronic obstructive pulmonary disease ranks as the sixth leading cause of death in the US, and predictions estimate that COPD will rise to the third most common cause of death worldwide by 2020.

2. Peak expiratory flow monitoring for patients with asthma is LEAST appropriate for those who:
   
   A. are elderly  
   B. are obese  
   C. have difficulty identifying asthma symptoms  
   D. have mild intermittent asthma***

   **Correct answer: D**  
   The NAEPP recommends that peak expiratory flow monitoring be included as part of an asthma action plan particularly for patients with moderate to severe persistent asthma. Peak expiratory flow monitoring would be most appropriate for patients who are elderly, obese, or have difficulty identifying asthma symptoms because scores from patient questionnaires may not be reliable in these patients, and they may require more objective spirometric monitoring.
3. For a 20-year old patient with asthma receiving salmeterol and fluticasone propionate (Advair Diskus) who needs to augment therapy from step 3 to 4, what is an appropriate increased total daily dosage of fluticasone?

A. 50 mcg  
B. 100 mcg  
C. 250 mcg  
D. 500 mcg

**Correct answer: D**

This question indicates that for this patient, an increase in the total daily dosage of fluticasone is possible when moving from Step 3 to Step 4 therapy. This means that at this patient’s current step 3 therapy, they are receiving a low-dose ICS and would be increasing the dose to a medium-dose ICS (Table 2). Low-daily-dose fluticasone propionate ranges from 100 to 300 mcg in adults (Table 5), and moving to medium-daily-dose fluticasone propionate would range from >300 to 500 mcg in adults. Available formulations of Advair Diskus include 100, 250, and 500 mcg fluticasone propionate per inhalation. Therefore, the achievable total daily dose for medium-dose Advair Diskus when administered twice daily per the package insert is 500 mcg.

4. Appropriate patient counseling on inhaler, spacer, and VHC use includes all of the following EXCEPT:

A. coordination of breathing is important with use of MDIs  
B. a minimum force of inhalation is required to aerosolize drugs administered via DPI  
C. VHCs allow for multiple inhalations when connected to an inhaler  
D. spacers and VHCs should be cleaned with water only and towel-dried

**Correct answer: D**

Drying spacers and VHCs with a towel may cause static, which can cause drug to deposit on the device and decrease the delivery of the drug to the lungs. Recommended cleaning of these devices includes washing every 1 to 2 weeks with water and dilute detergent and allowing them to air-dry. It is important that patients be able to coordinate breathing between actuation and inhalation and can exert the minimum inspiratory flow required to aerosolize the drug. Valved holding chambers do allow for multiple inhalations via use of a one-way valve, which can assist patients who have difficulty coordinating breathing.

5. Which of the following is TRUE regarding the inhaled respiratory agents, vilanterol/umeclidinium (Anoro Ellipta) and vilanterol/fluticasone furoate (Breo Ellipta)?

A. both are approved for treatment of asthma and COPD  
B. both are indicated for once-daily administration

**Correct answer: D**

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A. both are approved for treatment of asthma and COPD  
B. both are indicated for once-daily administration  
C. both are combinations of a LABA and an ICS  
D. both are combinations of a LABA and a LAMA
Correct answer: B
Both Anoro Ellipta and Breo Ellipta contain vilanterol, a LABA. Umeclidinium is a LAMA, while fluticasone furoate is an ICS. Both products are administered once daily and only Breo Ellipta is approved for both COPD and asthma.

6. Which of the following regimens is preferred initial treatment in a patient initiating pharmacotherapy for COPD with few symptoms and low exacerbation risk?

   A. ipratropium 4 times daily as needed and albuterol as needed***
   B. aclidinium twice daily and albuterol as needed
   C. indacaterol once daily and albuterol as needed
   D. budesonide twice daily and albuterol as needed

Correct answer: A
The first choice of treatment for a patient with COPD and few symptoms and low exacerbation risk is a short-acting anticholinergic as needed or a SABA as needed (Table 7, patient group A). Aclidinium and indacaterol are LABAs and would be an alternative choice for this patient. Budesonide is an ICS and would not be an option until patients are categorized in group C (few symptoms, high risk of exacerbations). All COPD patients should also receive a SABA as rescue therapy.

7. Which of the following is FALSE regarding antibiotic use in patients with COPD?

   A. Antibiotics may be used in patients with increased sputum purulence and increased dyspnea
   B. Antibiotics commonly used in COPD exacerbation include macrolides, cephalosporins, and doxycycline
   C. Macrolides and doxycycline may be used chronically to prevent exacerbation***
   D. Duration of antibiotic therapy for COPD exacerbation is typically 7 to 10 days

Correct answer: C
Chronic prophylaxis with antibiotics in patients with COPD may be achieved with macrolides only, because of their immunomodulatory effects. Commonly used antibiotics for treatment of COPD exacerbations include macrolides, second- or third-generation cephalosporins, and doxycycline, which are often given over 7 to 10 days.

8. What is an appropriate goal INR range for a patent with pulmonary hypertension who has no other compelling issues for anticoagulation?

   A. 1.0 to 2.0
   B. 1.5 to 2.5***
   C. 2.0 to 3.0
   D. 2.5 to 3.5

Correct answer: B
According to the ACCF/AHA 2009 expert consensus document on pulmonary hypertension, the recommended range of INR values for patients with idiopathic pulmonary hypertension with no other reason for anticoagulation is 1.5 to 2.5.

9. Which of the following is FALSE regarding treprostinil?

A. it is available as a solution rather than powder for reconstitution
B. it has a shorter half-life than epoprostenol***
C. it is available as an inhaled formulation
D. an appropriate initial dosage is 1.25 ng/kg/min infusion

Correct answer: B
Treprostinil is available in parenteral (Remodulin), inhaled (Tyvaso), and oral (Orenitram) formulations. Recommended initial dosage for infused treprostinil is 1.25 ng/kg/min. Treprostinil is available as a solution, which may be beneficial for patients who have difficulty with reconstitution of other parenteral prostanoids. The half-lives of epoprostenol and treprostinil are 3 to 5 minutes, and 4 hours, respectively.

10. Which of the following is TRUE regarding monitoring of patients receiving ERAs?

A. liver function testing should be performed monthly for patients receiving any ERA
B. pregnancy must be excluded prior to initiation of macitentan only
C. complete blood counts should be taken every 3 months for patients receiving bosentan***
D. only patients receiving ambrisentan should avoid CYP 3A4 inhibitors and inducers

Correct answer: C
Liver function testing is recommended to be performed monthly and indefinitely with bosentan and occasionally with other ERAs. Pregnancy should be excluded prior to initiation of all ERAs, as they are all classified as pregnancy category X. All ERAs are metabolized by CYP 3A4, and inhibitors and inducers of this enzyme may increase and decrease, respectively, the plasma concentrations of ERAs.