Chapter 6
Adrenergic (Sympathomimetic) Bronchodilators
Study Guide and Application Exercise

1. Read chapter.

2. Review objectives (p.97)

3. Review key terms and definitions (p.97-98)

4. What is the primary indication for short-acting adrenergic agents? (p.98)

5. Is “controller” bronchodilator a short-acting or long-acting drug?

6. How does “controller” differ from “rescue” bronchodilator? Give an example for each.

7. List the indications for racemic epinephrine. (p.98)

8. Review Table 6-1 (p.99) and study the generic names, brand names, receptor preference, onset time and peak time and duration.

9. Table 6-1, add vilanterol. (Note: vilanterol is not yet available as monotherapy for COPD). Two combination drugs are available: vilanterol + fluticasone (Breo Ellipta) and vilanterol + umeclidinium (Anoro Ellipta). Umeclidinium (Incruse Ellipta) is an anticholinergic. It is available as monotherapy for COPD.

10. Indacaterol (Arcapta Neohaler) and Olodaterol (Stiverdi Respimat) have a duration of action up to _________ (4, 8, 12, 24 (hours). (Table 6-1 p. 99, p.105-107)

11. Describe the purpose of developing drugs with L-, R- and L and R isomers. (p.100 and 103). Refer to S-epinephrine and R-epinephrine (Figure 6-2, p.100); albuterol (R,S-isomer and R-isomer (Figure 6-3, p. 101)

12. Catecholamines are metabolized by an enzyme called ______ that is found in the ______ (liver; kidney; liver and kidneys).

13. Study the figure and table for these drugs: catecholamine, resorcinol and saligenin.

14. What is a prodrug? (p.102)
15. Describe the advantages of levalbuterol (single-isomer) over albuterol (dual-isomer). (p. 102-103)

16. The extended-release albuterol is in _______ (DPI, MDI, aerosol, tablet) form. (p.105)

17. List the duration of action for each drug: salmeterol, formoterol, arformoterol, and indacaterol.

18. Salmeterol and formoterol both _______ (have; do not have) anti-inflammatory effects. These two drugs can be used to replace inhaled corticosteroids. (True/False)

19. _______ (Long-acting, Short-acting) _______ (alpha, beta-1, beta-2) agonist is the ideal drug to treat status asthmaticus (severe asthma attack). (p.107)


21. Describe the mode of action and clinical use of $\alpha$, $\beta_1$, and $\beta_2$ agonists. (p.109)

22. List the routes of administration for $\beta$-adrenergic bronchodilators and describe the special characteristics for each route. (p.111-113)

23. List the adverse side effects of $\beta$-adrenergic bronchodilators and describe the signs and symptoms for each side effect. (p.113-117)

24. Is mixing of common bronchodilators a safe practice?

25. Long-acting $\beta$ agonists may increase asthma hospitalization or cause death. (True/False)

26. Review “Respiratory Care Assessment of $\beta$-agonists Therapy.” (p.118)

27. Review and complete “Clinical Scenario.” (p.119).
Katie, a 45 year-old patient, was admitted to the Medical ICU for acute exacerbation of asthma. Medical history revealed she had a long history of asthma. Katie reported that she had been doing fine until three weeks ago when she changed her family physician (Dr. Whitesville) because of insurance reasons.

Prior to seeing Dr. Whitesville, she had been feeling great and without asthma symptoms. The asthma was well managed with Flovent MDI at 110 mcg/puff BID (a medium dose inhaled corticosteroid). Three weeks ago, Dr. Whitesville changed her asthma medication to Arcapta Neohaler (indacaterol) DPI 75 mcg/inhalation and albuterol MDI prn. She was using the Neohaler two times per day as she had been doing with Flovent. Her asthma flare ups became more frequent after starting the Neohaler. She had to use the rescue inhaler 2 to 3 times per day. This morning, she had to call 911 because she could not breathe well in spite of 12 to 16 puffs of albuterol. The ambulance took her to the Emergency Department. She was subsequently admitted to the MICU.

What are the causes of the patient’s most recent acute exacerbation of asthma? How would you manage Katie’s condition?