Chapter 9   Drugs for Treating Asthma

Case Study
This is your first year as an athletic trainer at a 4A high school. Although you have worked at smaller schools, this is your first job at a larger-division school. You want to be sure you are prepared for the coming year, so you go over the medical records of the school’s athletes. Of the 250 athletes, you realize that you have 20 athletes with chronic asthma and 3 athletes with exercise-induced bronchospasm. You realize that the best way to manage these student-athletes and assure good monitoring of their asthma is to develop a plan of care for asthma. You also want to create a record of each person’s peak flow meter results for peak expiratory flow and their daily results so you can anticipate problems before they arise. For best-care practice, you will need to know each person’s rescue drug used when he or she needs quick relief for an acute attack and where it is kept. You know that the most commonly used rescue drug includes short-acting β2-agonists, but you are not as familiar with the long-term drugs that control inflammation. You realize that because you can only recall that these long-term drugs are taken either orally or by using an inhaler, you need to refresh yourself on the various medications before practices start in 2 weeks. What classes of medications are used for chronic control of asthma? What adverse effects could be expected with each class?

Answer: The main therapy for long-term asthma control is inhaled corticosteroids. These are anti-inflammatory medications that suppress the chronic inflammation in the airways of patients with asthma and therefore decrease the frequency of asthma exacerbations. The asthma treatment guidelines recommend inhaled corticosteroids in all therapy steps for persistent asthma. Inhaled corticosteroids cause primarily localized adverse effects, including hoarseness and oral thrush. To minimize the risk of oral thrush, make sure athletes know to rinse their mouth following use of the corticosteroid inhaler. A spacer can also be used to reduce oral thrush risk. There is a possibility of slowed growth from inhaled corticosteroids; however, no effect on adult height has been demonstrated. The inhaled corticosteroids have significantly fewer adverse effects than systemic corticosteroids; therefore, systemic corticosteroids should only be used as chronic treatment in severe persistent asthma that is not sufficiently controlled by high-dose inhaled corticosteroid plus a long-acting β2-agonist. The long-acting β2-agonists are bronchodilators, but they should never be used alone for chronic asthma management; they should always be combined with an inhaled corticosteroid. This is required due to the finding of increased asthma exacerbations and increased risk of asthma-related death when long-acting β2-agonists were used alone. The leukotriene modifiers are anti-inflammatory agents that can be used as alternative therapy in chronic asthma management. All of these agents can cause neuropsychiatric adverse effects, and zafirlukast and zileuton have both been associated with liver toxicity. The mast cell stabilizers and methylxanthines are also alternative therapies but have disadvantages in dosing frequency and adverse effects.

Exam Questions
1. An athlete is experiencing acute symptoms of asthma, including wheezing and difficulty breathing. Which of the following agents would be appropriate to administer in this situation?
   a. Fluticasone.
   b. Zileuton.
   c. Albuterol.
   d. Salmeterol.

2. Which of the following classes of medications is classified as a bronchodilator?
   a. Leukotriene receptor antagonists.
b. Corticosteroids.
c. Mast cell stabilizers.
d. \( \beta_2 \)-receptor agonists.

3. An athlete who uses an inhaled corticosteroid for chronic asthma management should rinse her mouth following using the inhaler to decrease the risk of:
   a. Dental caries.
   b. Oral thrush.
   c. Asthma exacerbation.
   d. Taste disturbances.

4. The long-acting \( \beta_2 \)-agonists are always used in combination with:
   a. An inhaled corticosteroid.
   b. Methylxanthine.
   c. A leukotriene modifier.
   d. A mast cell stabilizer.

5. A serious adverse effect most associated with the use of zafirlukast is:
   a. Increased risk of asthma exacerbations.
   b. Hepatotoxicity.
   c. Anaphylaxis.
   d. Osteoporosis.

6. Which of the following is a criterion for diagnosis of moderate persistent asthma?
   a. Severe limitation of normal activities.
   b. Nighttime awakenings 3 to 4 times per month.
   c. Forced expiratory volume in 1 second (FEV\(_1\)) <60% of predicted.
   d. Daily use of a short-acting \( \beta_2 \)-agonist.

7. The long-term control medication combination recommended for step 4 asthma treatment is:
   a. A short-acting \( \beta_2 \)-agonist + a leukotriene modifier.
   b. A low-dose inhaled corticosteroid + a mast cell stabilizer.
   c. A medium-dose inhaled corticosteroid + a long-acting \( \beta_2 \)-agonist.
   d. A high-dose inhaled corticosteroid + an oral corticosteroid.

8. In an athlete with exercise-induced bronchospasm, a quick-relief medication should be administered ______ prior to exercise.
   a. 5 to 15 minutes.
   b. 30 to 60 minutes.
   c. 2 to 4 hours.
   d. 12 to 24 hours.

9. Which of the following medications for chronic asthma management is administered orally?
   a. Ciclesonide.
   b. Salmeterol.
   c. Montelukast.
   d. Cromolyn.
10. Omalizumab is effective in allergy-induced asthma because it antagonizes the effects of:
   a. LTC₄.
   b. Immunoglobulin E.
   c. Histamine.
   d. Bradykinin.