Chapter 12  Drugs for Treating Hypertension and Heart Disease

Case Study
Two of your largest football offensive linemen, Dan and Andrew, were put on antihypertensive medications over the summer. You were concerned about their blood pressures during spring practice because routine blood pressure readings on both of them indicated they were hypertensive, with readings in the 146/92 and 152/94 ranges, so you are pleased that they followed up with their family physicians. Andy is now taking losartan, and Danny is taking lisinopril. You know that both of these medications affect the renin-angiotensin system, but because you are unfamiliar with the side effects, you decide to look them up in case either of the athletes reports to you with any complaints. What is the difference between these 2 medications? What adverse effects could the athletes experience?

Answer: Losartan is an angiotensin receptor blocker (ARB), and lisinopril is an angiotensin-converting enzyme (ACE) inhibitor. Both of these decrease the activity of angiotensin II, but they do it in 2 different ways. Losartan blocks the action of angiotensin II at its receptor, whereas lisinopril inhibits the synthesis of angiotensin II. In terms of adverse effects, the ACE inhibitors tend to cause more adverse effects compared with ARBs. Both of these medications have the potential to cause hyperkalemia, although the risk is higher with lisinopril. A dry cough is common with ACE inhibitors but does not occur with ARBs. A serious adverse effect that can occur with ACE inhibitors, and to a lesser extent ARBs, is angioedema. Athletes should be educated on the symptoms of angioedema because this is a medical emergency.

Exam Questions
1. Stimulation of alpha-1 receptors results in:
   a. Bronchoconstriction.
   b. Bronchodilation.
   c. Vasoconstriction.
   d. Vasodilation.

2. A Black athlete has been diagnosed with hypertension. Which agent would be recommended for initial antihypertensive therapy in this athlete?
   a. An ACE inhibitor.
   b. A thiazide diuretic.
   c. A beta-blocker.
   d. A direct-acting vasodilator.

3. The athletic trainer would be concerned about the development of exercise intolerance from the use of:
   a. Beta-blockers.
   b. ACE inhibitors.
   c. Calcium channel blockers.
   d. Thiazide diuretics.

4. Hypokalemia is an adverse effect associated with:
   a. Calcium channel blockers.
   b. Organic nitrates.
   c. ACE inhibitors.
   d. Loop diuretics.
5. Which class of medications is used in the treatment of both chronic stable angina and vasospastic angina?
   a. ARBs.
   b. Beta-blockers.
   c. Calcium channel blockers.
   d. Aldosterone antagonists.

6. An athlete with hypertension tells you that he has developed a nonproductive cough that isn’t going away, and he doesn’t have any symptoms of respiratory illness. What class of medications could be the cause of this adverse effect?
   a. ACE inhibitors.
   b. Aldosterone antagonists.
   c. Loop diuretics.
   d. ARBs.

7. The goal blood pressure for a 35-year-old White patient with hypertension is:
   a. <120/80.
   b. <130/80.
   c. <140/90.
   d. <150/90.

8. Which of the following is a therapeutic use of sublingual nitroglycerin?
   b. **Treatment of acute angina attacks in patients with chronic stable angina.**
   c. Reduction of blood pressure in essential hypertension.
   d. Prevention of reflex tachycardia in patients taking calcium channel blockers.

9. The standard therapy for heart failure includes:
   a. Beta-blockers, ACE inhibitors, and diuretics
   b. Digoxin, diuretics, and ACE inhibitors.
   c. Alpha-blockers, aldosterone antagonists, and diuretics.
   d. Organic nitrates, ACE inhibitors, and beta-blockers.

10. The athletic trainer should educate the diabetic athlete about the possibility of the adverse effect of hyperglycemia from:
    a. Beta-blockers.
    b. **Thiazide diuretics.**
    c. Calcium channel blockers.
    d. ACE inhibitors.