Calcium and Phosphorus Metabolism in Chronic Kidney Disease and the Management of Hyperphosphatemia: A Primer for Pharmacists

Rationale for Posttest Answers

1. The prevalence of chronic kidney disease (CKD) in patients older than 64 years of age has been found to range as high as 35%
   a. True
   b. False
   ANSWER: A. Slide 3
   Rationale: Prevalence ranges between 23.4% to 35.8% in this age group

2. All of the following are common misconceptions about calcium and CKD EXCEPT:
   a. There is incomplete knowledge about gastrointestinal calcium absorption and calcium balance in CKD
   b. When serum calcium is in the normal range, fundamental defects in calcium distribution in CKD can still exist.
   c. Vascular calcification is generally silent and often unrecognized
   d. Calcium concentration abnormalities usually manifest in late stages of CKD
   ANSWER: D. Slides 10 and 11
   Rationale: All are misconceptions except D; calcium concentrations usually remain normal until the late in CKD

3. Dietary calcium (calcium in food) is strongly related to an increased risk of vascular events
   a. True
   b. False
   ANSWER: B. Slide 19
   Rationale: Calcium supplements increase the risk of vascular events

4. Functional disruption of calcium metabolism leads to which of the following?
   a. Bone calcium loss
   b. Bone disease
   c. Vascular calcification
   d. All of the above
   ANSWER: D. Slide 15
   Rationale: This is the cascade of events that may occur with disruption

5. High normal levels of serum calcium are associated with all of the following EXCEPT:
   a. Increased aortic calcification
   b. Increased coronary artery calcification
   c. Increased incidence of heart failure
   d. Increased incidence of coronary artery disease
   ANSWER: C. Slide 26
   Rationale: All are true except C; these levels of calcium are associated with coronary artery calcification, CAD, and stroke, not heart failure specifically
6. Calcium balance studies have demonstrated that patients with CKD exhibit neutral calcium balance when ingesting which of the following amounts of calcium daily?
   a. 500 mg
   b. 800 mg
   c. 1,000 mg
   d. 1,500 mg
   **ANSWER: B. Slide 24**
   **Rationale:** This is the recommended level for these patients

7. Changes in serum phosphorus concentrations usually occur in the later stages of CKD.
   a. True
   b. False
   **ANSWER: A. Slide 10**
   **Rationale:** Rising phosphorus is not observed until late in the course of CKD progression, and a slight drop in serum calcium is also seen at this time

8. Kidney Disease Improving Global Outcomes (KDIGO) guidelines recommend lowering serum phosphorus below the normal range in patients with Stage 3 to 5 CKD
   a. True
   b. False
   **ANSWER: B. Slide 42**
   **Rationale:** "In patients with CKD stages 3–5, we suggest maintaining serum phosphorus in the normal range"

9. Phosphate binders available by prescription include all of the following EXCEPT:
   a. Calcium carbonate
   b. Calcium acetate
   c. Lanthanum carbonate
   d. Sevelamer carbonate
   **ANSWER: A. Slide 43**
   **Rationale:** Calcium carbonate binders are not available by prescription and are over the counter products not prescribed by healthcare professionals

10. The relative risk of vascular calcification is lower with the use of non-calcium phosphate binders in patients with CKD
    a. True
    b. False
    **ANSWER: A. Slide 51**
    **Rationale:** A meta-analysis of multiple studies demonstrated a distinct trend toward non-calcium binders showing lower coronary calcifications rates or less likelihood of coronary artery/vascular calcification