Prevention and Diagnosis of Osteoporosis: Review Questions

Thomas F. Heston, MD, FAAFP

QUESTIONS

Choose the single best answer for each question.

1. **Risk factors that are significantly associated with the diagnosis of osteoporosis include:**
    A) Sedentary lifestyle
    B) Smoking
    C) Postmenopause
    D) High body mass index
    E) Low dietary calcium intake

2. **The initial clinical finding of osteoporosis is:**
    A) Back pain
    B) Loss of height
    C) Lack of symptoms
    D) Spontaneous vertebral compression fracture
    E) Kyphosis

3. **Which of the following laboratory tests is abnormal in patients with osteoporosis?**
    A) Serum calcium
    B) Alkaline phosphatase
    C) Parathyroid hormone
    D) Serum phosphate
    E) None of the above

4. **Which of the following is the most effective means for prevention of osteoporosis in postmenopausal women?**
    A) Smoking cessation
    B) Increased physical activity
    C) Hormone replacement therapy
    D) Dietary calcium intake of 1200 to 1500 mg/day
    E) Restriction of alcohol consumption

5. **All of the following statements regarding osteoporosis are true EXCEPT:**
    A) Men older than age 50 years are more likely to experience an osteoporosis-related fracture than clinical prostate cancer.
    B) Seventy-five percent of all hip fractures occur in women.
    C) One third of women age 80 years or older experience a hip fracture.
    D) The annual cost for treating hip fractures in the United States is approximately $5 billion.
    E) One third of women age 65 years or older experience one or more vertebral compression fractures.

Dr. Heston is a physician in family practice and nuclear medicine, Kellogg, ID.

EXPLANATION OF ANSWERS

1. (C) Postmenopause. In a study of 358 women, risk factor analysis was an inadequate method to predict whether a woman had osteoporosis.[1] Although smoking, a sedentary lifestyle, and low dietary calcium intake are associated with a lower bone mineral density, these factors are inadequate in determining whether the bone mineral density is low enough to be osteoporosis. The only risk factors significantly associated with osteoporosis in this study were a low body mass index and the postmenopausal state. The implications of this research are important. The diagnosis of osteoporosis cannot be made by gestalt or by clinical impression. Risk factor analysis is only a crude method of stratification. Family history, smoking status, activity level, and number of pregnancies—all traditionally thought to be important risk factors—have not been shown to predict osteoporosis with any degree of certainty. These risk factors help the clinician determine who may be at risk but do not provide any actual measures of bone mineral density.

2. (C) Lack of symptoms. A patient with osteoporosis is usually asymptomatic until a fracture occurs.[2] Loss of height, compression fractures, and back pain generally occur after the development of osteoporosis. Because of the lack of clinical findings and a poor association of risk factors with the diagnosis of osteoporosis, a screening bone mineral density test is essential in the diagnosis. Osteoporosis remains a clinically silent and largely undiagnosed disease. According to the Centers for Disease Control and Prevention,[3] 93% of the more than 2000 osteoporotic women studied were unaware of their condition.

3. (E) None of the above. The results of serum calcium, alkaline phosphatase, parathyroid hormone, and serum phosphate tests are generally normal in patients with osteoporosis, therefore, laboratory testing is not useful in the diagnosis of osteoporosis.[2] Among imaging methods, dual energy x-ray absorptiometry (DEXA) is the test of choice because of its high accuracy, low radiation exposure to the patient, and low cost. Conventional radiographs are not useful in the early diagnosis of osteoporosis because 30% to 60% of the bone mineral must be lost before the radiograph shows osteopenia. Quantitative computed tomography scans are rarely used because of their expense and degree of radiation exposure to the patient.

4. (C) Hormone replacement therapy. Hormone replacement therapy is the most effective way to prevent osteoporosis in the postmenopausal woman.[4] Estrogen currently is the hormone of choice, however, there is great interest in the selective estrogen receptor modulators such as raloxifene, which have also been shown to decrease bone loss among postmenopausal women. Early research also suggests that raloxifene decreases the risk of breast cancer. It is recommended that hormone replacement therapy be continued for at least 10 years, although the optimal duration of therapy is still unknown.

5. (D) The annual cost for treating hip fractures in the United States is approximately $5 billion (FALSE). The health care costs in treating osteoporotic fractures exceeds $13 billion annually in the United States.[5] Osteoporosis in men is still relatively unstudied. Although it is known that women experience osteoporosis much more frequently than men, the disease is not uncommon in men. An estimated 1.5 million American men have osteoporosis, and 3.5 million have osteopenia. According to Galus,[6] osteoporosis-related fractures in men are more common than clinically significant prostate cancer. One third of all women age 65 years or older experience one or more vertebral compression fractures, and one third of women age 80 years or older experience a hip fracture. One out of four hip fractures occurs in men.

REFERENCES

1. McKnight A, Steele K, Mills K, et al: Bone mineral density in relation to medical and lifestyle risk factors for osteoporosis in premenopausal, menopausal, and postmenopausal women in general practice. *Br J Gen Pract* 1995;45:317–320.
2. Fitzgerald PA: Endocrinology. In *Current Medical Diagnosis and Treatment,* 38th ed. Tierney LM, McPhee SJ, Papadakis MA, eds. Stamford, CT: Appleton & Lange, 1999.
3. Centers for Disease Control and Prevention: Osteoporosis among estrogen-deficient women—United States, 1988–1994. *MMWR Morb Mortal Wkly Rep* November 20 1998;47(45):969–973. [Online] Available at http://www.cdc.gov/epo/mmwr/preview/mmwrhtml/00055690.htm. Accessed October 18, 1999.
4. Lyles KW: Osteoporosis: pathophysiology, clinical presentation, and management. In *Textbook of Internal Medicine,* 3rd ed. Kelley WN, Dupont HL, Glick JH, et al, eds. Philadelphia: Lippincott-Raven, 1997.
5. Woolliscroft JO, ed: *Current Diagnosis and Treatment,* 2nd ed. St. Louis: Mosby, 1999.
6. Galus MA: Osteoporosis in men. *Consultant* 1999;39:1640.