

Osteoporosis: Review Questions

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QUESTIONS

Choose the single best answer for each question.

- All of the following are risk factors for osteoporosis EXCEPT:**
 - Low calcium intake
 - Smoking
 - Alcohol use
 - Turner's syndrome
 - Obesity
- Which of the following medical conditions or medications can lead to secondary osteoporosis?**
 - Hypothyroidism
 - Zinc deficiency
 - Type 2 diabetes mellitus
 - Gonadotropin-releasing hormone (GnRH) agonists
 - Angiotensin-converting enzyme (ACE) inhibitors
- A 50-year-old African American woman visits your office for an annual examination. She takes inhaled steroids and β -agonists for mild intermittent asthma. Her past medical history is negative for any fracture. She has no family history of osteoporosis. She exercises regularly. Her menses are regular. Based on her history, what are your recommendations for osteoporosis prevention and screening?**
 - Take 800 mg of calcium and 800 IU vitamin D daily
 - Take 1200 mg of calcium and 400 IU vitamin D daily
 - Bone mineral density (BMD) screening
 - Begin calcitonin therapy to increase bone density
 - Begin alendronate therapy to increase bone density
- A 65-year-old white woman presents for interpretation of BMD testing. Her personal medical history is unremarkable, but her mother died at age 75 years due to complications of a hip fracture. Her T score is -2 . Which of the following choices is the correct interpretation of this patient's T score and treatment?**
 - Normal BMD; calcium supplementation
 - Normal BMD; alendronate for prevention
 - Osteopenia; zinc supplementation for prevention
 - Osteopenia; alendronate for treatment
 - Osteoporosis; residronate for treatment
- An 80-year-old Asian woman presents to your office with back pain. She notes that the pain began on the previous day after stepping off a curb. She has been unable to sleep due to the pain. Physical examination reveals she has a dorsal kyphosis and tenderness over a midthoracic spinous process. Results of neurologic examination are negative for signs of cord compression. You prescribe a mild narcotic pain reliever and order thoracic spine films. Which of the following medications would be of most immediate benefit to this patient?**
 - Calcium supplements
 - Residronate
 - Calcitonin
 - Estrogen
 - Alendronate

(turn page for answers)

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EXPLANATION OF ANSWERS

- 1. (E) Obesity.** Risk factors for osteoporosis may be inherited or acquired.^{1,2} Inherited factors include female sex and white or Asian ancestry. Women with Turner's syndrome or any condition leading to low estrogen levels are at increased risk of osteoporosis. Women with a personal history of fracture as an adult or history of osteoporosis in a first-degree relative also are at increased risk. Acquired risk factors include current smoking (≥ 1 pack per day), alcohol use (≥ 2 drinks per day), low calcium intake (< 1200 mg per day), and sedentary lifestyle. Finally, women with low body weight (< 127 lb) are at increased risk for osteoporosis. Guidelines for osteoporosis screening and prevention are available only for women at this time.
- 2. (D) GnRH agonists.** Osteoporosis can occur secondary to any condition or medication that causes accelerated bone loss.² Conditions that may cause secondary osteoporosis include athletic amenorrhea, anorexia nervosa, hyperthyroidism, type 1 diabetes mellitus, and malabsorption syndromes. Medications that can cause secondary osteoporosis include excessive use of thyroid hormone, oral corticosteroids (taken for > 3 months' duration), GnRH agonists, phenytoin, phenothiazines, long-term heparin, and phenobarbital. ACE inhibitors and zinc deficiency do not cause osteoporosis.
- 3. (B) Take 1200 mg of calcium and 400 IU vitamin D daily.** This patient has no risk factors for osteoporosis. Although oral steroids are a recognized cause of increased bone loss in adults, inhaled steroids are not. The National Osteoporosis Foundation (NOF) advises that all individuals consume at least 1200 mg of calcium and 400 to 800 IU vitamin D daily.¹ The US Preventive Services Task Force recommends that physicians conduct routine BMD screening for all women older than 65 years.³ For women with risk factors for osteoporosis, screening is recommended beginning at age 60 years. Alendronate is a Food and Drug Administration (FDA)-approved medication for prevention and treatment of osteoporosis. Calcitonin is approved for treatment of osteoporosis only, not prevention.
- 4. (D) Osteopenia; alendronate for treatment.** The T score compares the patient's BMD in standard deviations with the average BMD of a young adult of the same gender. T score between 0 and -1 indicates normal bone density. A T score between -1 and -2.5 are consistent with osteopenia. T score 2.5 standard deviations or more below the standard (T score ≤ -2.5) indicates osteoporosis. This patient

is at increased risk for osteoporosis owing to her race and family history. Her BMD testing results indicate that she has osteopenia. Alendronate, a bisphosphonate compound proven to increase bone mass and decrease fractures, would be an appropriate choice for this patient.⁴ The NOF recommends pharmacologic therapy to reduce fracture risk in all postmenopausal women with T scores of -2 or below. Drug therapy also is recommended for postmenopausal women with risk factors for osteoporosis and T scores below -1.5 or those with hip or vertebral fractures. Because the case patient's T score is below -1.5 , her treatment should include reduction of modifiable risk factors, calcium and vitamin D supplementation, and additional drug therapy.

- 5. (C) Calcitonin.** Sudden onset of severe back pain following minimal or no trauma suggests an osteoporotic vertebral fracture. The presence of a dorsal kyphosis also points to osteoporosis. Treatment with narcotic analgesia is appropriate for a presumed vertebral fracture. Plain radiographs may or may not reveal the acute fracture but are useful to rule out other bone pathology, such as metastatic disease. This patient should have calcium supplementation, but other medication is indicated for treatment of osteoporosis. Estrogen, alendronate, and risedronate are FDA-approved for the prevention and treatment of osteoporosis but do not provide immediate relief.⁵ However, the FDA recommends nonestrogen treatments be considered first for osteoporosis. In addition to reducing vertebral fractures, calcitonin has been shown to produce significant alleviation of the acute pain from osteoporotic vertebral fractures.⁶

REFERENCES

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