VIEWPOINT

Osteoporosis and Fracture Risk Evaluation and Management

Shared Decision Making in Clinical Practice

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Fractures due to osteoporosis represent a serious and costly public health problem, leading to disability and increased mortality risk.[1] For postmenopausal women, osteoporotic fractures are more common than stroke, myocardial infarction, and breast cancer combined.[2] A fracture can be a life-changing event and may represent a significant threat to personal independence. Although osteoporosis is commonly defined as "a skeletal disorder characterized by decreased bone strength predisposing to an increased risk of fracture," it is fracture that is the important end result. A more pragmatic definition is "high risk of fracture, due at least in part to increased skeletal fragility." Primary care clinicians should be comfortable evaluating, preventing, and treating osteoporosis and related risks (**Box**).

Skeletal fragility and high risk of fracture can occur at any age, in any race, and either sex but is more common in women than men and increasingly common with advancing age. A fracture with minimal or moderate trauma should lead to further evaluation. Fractures of the long bones (arms, legs), spine, and pelvis are associated with increased risk of future fractures, whereas fractures of fingers, toes, hands, feet, skull, or face (and possibly fractures of ribs, knees, elbows, and shoulders) are not. Other than fractures, there may be no signs or symptoms of osteoporosis. Therefore, a fracture risk assessment is necessary to identify people at risk.

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Bone mineral density (BMD) measurement using dual-energy x-ray absorptiometry (DXA) is recommended for women at age 65 years and men at age 70 years in the absence of risk factors (other than age)[3]; however, a clinical fracture risk assessment should be performed around age 50 years (or earlier for women who undergo premature menopause) for risk factors: low body weight, early menopause (before about age 45 years), family history of osteoporosis, diseases (eg, rheumatoid arthritis, inflammatory bowel disease, chronic obstructive pulmonary disease), and drugs (eg, glucocorticoids, proton pump inhibitors, selective serotonin reuptake inhibitors) that increase fracture risk. The presence of any of these factors would be reasons to order a bone density assessment sooner.[4]

Adequate calcium, vitamin D, and exercise involving weight-bearing and resistance are important for bone health at any age and likely contribute to the effectiveness of medications to reduce fracture risk. The Institute of Medicine (now the National Academy of Medicine) recommends calcium intake of 1000 to 1200 mg/d, ideally from foods; calcium supplements may be needed for patients whose diets do not supply sufficient calcium. For vitamin D, 600 to 800 IU/d is recommended for public health purposes, but a supplement of 1000 to 2000 IU/d is reasonable for those at increased risk of osteoporosis; serum 25-hydroxyvitamin D levels higher than 30 ng/mL (to convert to nmol/L, multiply by 2.496) may be the appropriate target in such patients. Walking (or a weight-bearing "walking equivalent" such as treadmill or elliptical) for 30 to 40 minutes at least 3 times per week is ideal (5 sessions per week of aerobic activity is recommended for cardiovascular fitness; additional sessions, if needed could be non–weight bearing, such as swimming or cycling).

In addition to calcium, vitamin D, and exercise, patients at high risk of fracture should be offered medication to reduce fracture risk. The US National Osteoporosis Foundation recommends pharmacologic treatment for patients with hip or spine fractures thought to be related to osteoporosis, those with a BMD standard deviation of 2.5 or more below the young normal mean (T score, −2.5 or lower) and those with a BMD standard deviation between 1 and 2.5 below the young normal mean whose 10-year risk, using an online fracture risk calculator called FRAX,[5] is 3% or more for hip fracture or 20% or more for major osteoporosis-related fracture (hip, humerus, forearm, and clinical vertebral fracture combined).[3]

Before initiating pharmacologic treatment, laboratory studies should include measurement of serum calcium and creatinine. Antiresorptive medications are contraindicated if hypocalcemia is present and bisphosphonates, either oral or intravenously, should not be given if kidney function is reduced (ie, glomerular filtration rate should be >30 or 35 mL/min). A complete blood cell count, chemistry panel, including serum phosphorus and 25-hydroxyvitamin D, also should be obtained to evaluate whether other health issues (such as hypercalcemia, multiple myeloma, liver or kidney disease, hypophosphatemia) require attention.[4]

Four medications currently approved by the US Food and Drug Administration increase bone strength by

reducing bone resorption. These include 2 oral bisphosphonates, alendronate weekly, or risedronate weekly or monthly (both available as generic products) and 2 nonoral agents, zoledronic acid (a bisphosphonate) administered intravenously once yearly and denosumab (a receptor activator of nuclear factor κB-ligand inhibitor) administered subcutaneously twice yearly. These medications, have been shown to reduce the risk of spine, hip, and nonvertebral fractures.[4] For most patients in a primary care setting, an oral bisphosphonate is an appropriate first-line treatment. For other medications, patient consultation with an osteoporosis specialist may be helpful.

Although treatment to reduce fracture risk is a long-term proposition, bisphosphonates accumulate in bone; after a period of "loading," administration can be withheld for a "drug holiday" of at least a year or 2. Limited data suggest that patients at lower risk can start a drug holiday after 5 years of oral or 3 years of intravenous bisphosphonate treatment, whereas patients at higher risk should continue oral treatment for 10 years or intravenous treatment for at least 6 years.[6] The effects of denosumab are not sustained when treatment is stopped, so there is no drug holiday with this medication.[7] Other treatment options in selected cases include raloxifene, which reduces the risk of spine fractures but not hip or nonvertebral fractures but also reduces the risk of breast cancer, and teriparatide, which as an anabolic agent has a different mechanism of action from the other agents and is usually reserved for patients whose osteoporosis is unusually severe or who are not responding to other therapies.

Repeating DXA after 1 to 2 years of treatment and periodically after that is useful for monitoring treatment.[4] If bone density decreases or a fracture occurs, the patient should be reevaluated and treatment options reconsidered.

Patient understanding is important for acceptance of and adherence to treatment. Likely this will require at least 2 visits with the physician and health care team. The first visit involves starting the process with a fracture risk assessment and, if appropriate, an order for DXA measurement. The second, which should occur shortly thereafter at the mutual convenience of the patient and clinician, involves discussion of the results and development of a management plan that is acceptable to the patient. Sample patient information material is available and may be helpful to provide to patients.[8]

For diseases in which patients are asymptomatic, adherence to treatment to reduce risk of future adverse events is poor. With some treatments for osteoporosis, publicity about rare but concerning safety issues (osteonecrosis of the jaw, atypical femur fractures) has contributed to lack of acceptance or continuation of treatments. Understanding patients' decision making[9] and providing accurate information—that in most cases, benefits of treatment far outweigh the risks—are essential for optimal long-term management of this potentially serious disorder.[10]

Box. Osteoporosis and Fracture Risk Evaluation and Management

Identification and Assessment

Identify patients with fractures from minimal or moderate trauma in adulthood to especially humerus, radius, femur, vertebra, or pelvis

In the absence of fracture, around age 50 years, ask about factors associated with increased fracture risk such as low body weight, early menopause, family history of osteoporosis, selected diseases and medications known to increase fracture risk (glucocorticoids, proton pump inhibitors, selective serotonin reuptake inhibitors)

Bone mineral density measurement using dual-energy x-ray absorptiometry (DXA) is advised for women by age 65 years and men by age 70 years in the absence of risk factors but should be done sooner if someone has a significant fracture or one or more clinical risk factors

When medications to reduce fracture risk are being considered, laboratory assessment is recommended (blood count, chemistry panel, 25-hydroxyvitamin D)

Management of Patients at High Risk of Fracture

At least 1 session devoted to patient education about osteoporosis, fracture risk, and medication choices

Adequate calcium, vitamin D, and weight-bearing and resistance exercise

Consider one of several pharmacologic agents to reduce fracture risk

- Oral options: alendronate or risedronate
- Nonoral options: denosumab, teriparatide, and zoledronic acid (consider referral to osteoporosis specialist)

Also identify and address nonskeletal risk factors for falling and fracture: problems with vision, hearing, balance, home safety adjustments, avoidance of floor rugs, etc

Reassess progress periodically (every 1 to 2 years)

ARTICLE INFORMATION

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