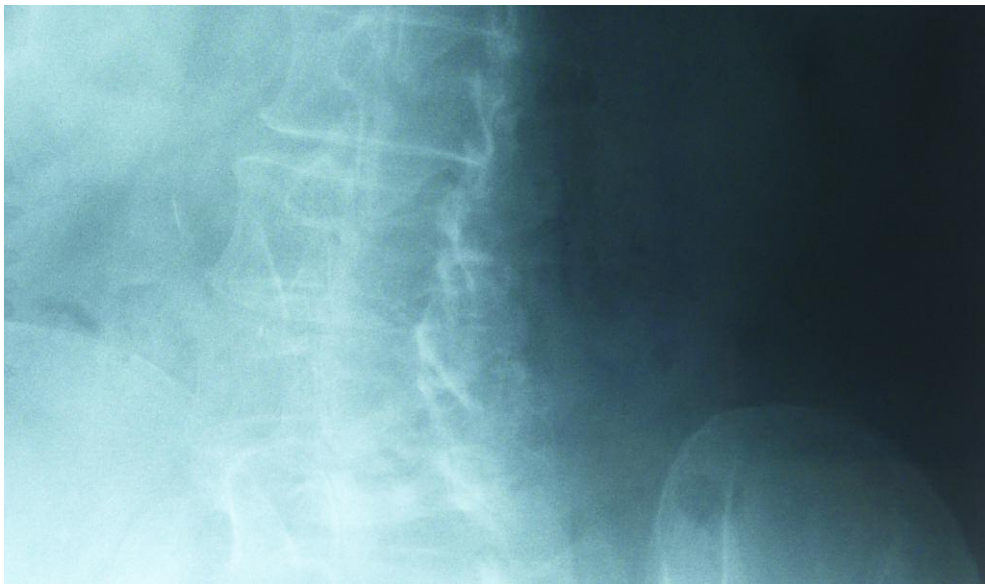
AMDA Clinical Practice Guideline: Osteoporosis in Assisted Living



Assisted living facilities need to be vigilant about identifying and addressing osteoporosis among its residents. The condition reduces the structural integrity of bone so that fractures can occur with little or no trauma. In fact, 30-50% of women and 15-30% of men will suffer an osteoporosis-related fracture in their lifetime; and nearly 75% of hip, spine, and distal forearm fractures occur among individuals who are 65 years old or older.

Fractures, in general, result in pain and at least temporary loss of function (see Table 1). However, hip fractures in particular are debilitating and deadly. These injuries are associated with chronic pain, reduced mobility, disability, and decreased independence. After suffering a hip fracture, 10-20% of formerly independent, community-dwelling individuals require long term care. Hip fractures cause the most morbidity with reported mortality rates of up to 24% in the first year after the injury.

Fractures also place an enormous burden on the U.S. health care system. According to the International Osteoporosis Foundation, annual direct medical costs in 1995 alone totaled $13.8 million (or $17.5 billion adjusted to 2002 dollars) for the treatment of osteoporosis-related fractures. Hip fractures accounted for the majority of these expenditures. It is estimated that in a 10-year period, hip, spine, and forearm fractures in postmenopausal Caucasian women in this country lead to over $45 billion in direct medical expenses.

This adaptation of the American Medical Directors Association's (AMDA) clinical practice guideline on osteoporosis is designed to help ALFs effectively identify, diagnose, manage, and monitor osteoporosis in a way that maximizes outcomes and quality of life for its residents and enables them to age in place for as long as possible.

Definition

The World Health Organization (WHO) consensus conference defined osteoporosis as "a disease characterized by low bone mass and micro-architectural deterioration of bone tissue, leading to enhanced bone fragility and a consequent increase in fracture risk."

Introduction

The aging process is associated with reduced bone formation relative to

Table 1.
Clinical Complications of Fracture

Clinical complications of fractures may include:

- Back pain or pain at fracture site
- Decline in function and mobility
- Deformity
- Neurological impingement syndromes
- Physical deconditioning due to inactivity
- Postural changes
- Restrictive lung disease
- Anxiety
- Changes in self-image or loss of self-esteem
- Depression
- Fear of falling
- Loss of social role
- Social isolation

bone reabsorption. Aging and calcium and vitamin D intake, together with estrogen deficiency in postmenopausal women (and possibly also in older men), result in increased bone resorption. Lack of physical activity, certain medications or chronic illnesses, and genetic predisposition are among the risk factors for the condition.

Recognition

Step 1. Does the patient have osteoporosis or evidence of its complications? Available admission or transfer information—including discharge summaries and referral data, patient and caregiver histories, previous x-ray reports, previous bone density study results by dual energy x-ray absorptiometry (DEXA), and medical histories—can help to identify residents with osteoporosis.

The presence of kyphosis, a history of fractures with minimal or no trauma, a loss of height associated with back pain (indicating vertebral compression), or a loss of height relative to the individual's height at age 30 strongly suggests the presence of osteoporosis. A DEXA scan may be considered to confirm the diagnosis or to assess the severity of osteoporosis.

Step 2. Is the patient at risk for additional loss of bone mass? Identification of patients who have low bone loss or who are at risk for losing bone mass enables intervention, where clinically appropriate, to try to prevent progression to osteoporosis. Table 2 lists some risk factors for the condition.

Postmenopausal women may be at greater risk because of bone loss caused by lack of estrogen. At the same time, certain medications heighten the risk of osteoporosis. These include corticosteroids, phenytoin, loop diuretics, and high doses of thyroid hormone replacement. It also will be important to consider secondary causes of osteoporosis such as chronic liver failure, chronic obstructive lung disease, chronic renal failure, hypogonadism, and Cushing's syndrome.

Identification of patients who have low bone loss or who are at risk for losing bone mass enables intervention to try to prevent progression to osteoporosis.

Assessment

The diagnosis of osteoporosis should be made on the basis of the patient's personal and family history, physician examination findings, laboratory values, and results of bone mineral density (BMD) testing. Current recommendations say that persons at risk for osteoporosis should be formally evaluated by DEXA of the spine, hip, and forearm. Other, more portable technologies are available to measure heel, finger, and forearm bone density, but a standard of comparability for different devices and sites for assessing fracture risk has not been fully established.

WHO criterion for osteoporosis is BMD that is 2.5 standard deviations (SD) below the average for young, healthy white women. Patients with osteoporotic fragility fractures (eg, of the spine or hip) may be diagnosed with osteoporosis even if their BMD is above the WHO threshold.

Current definitions of the disease by T score are the same for men and women and for all racial and ethnic groups. It is important to emphasize that there is no "safe" T score. Each decrease of one SD in hip BMD from age-matched controls is thought to be associated with a twofold increase in vertebral fracture risk and a 2.6-fold increase in hip fracture risk.

Step 3. Decide if a workup is appropriate and likely to be medically helpful. The extent of bone loss in individuals who are appropriate candidates for evaluation can be

Table 2.
Risk Factors for Osteoporosis

Non-modifiable

- Age
- Caucasian or Asian race
- Female gender
- Personal history of dementia, poor health, or frailty
- Personal or family history of fracture as an adult
- Small body frame, weight < 127 lbs

Potentially modifiable

- Alcohol abuse
- Diseases associated with secondary osteoporosis
- Functional impairment
- Inadequate exercise
- Inadequate intake of calcium and vitamin D
- Medications that adversely affect bone metabolism
- Smoking

determined by BMD measurement of the hip and spine by central DEXA, which is more reliable than clinical observation as a predictor of fracture risk. This technique may be especially helpful in individuals with estrogen deficiency, vertebral abnormalities, asymptomatic primary hyperparathyroidism, and chronic corticosteroid usage.

However, central DEXA testing presents certain problems in older individuals. In persons over age 70, spinal BMD may appear higher than it really is because of the presence of disc disease, sclerosis, degenerative arthritis, or aortic calcification. Quantitative computed tomography (QCT) of the spine may be used as the primary diagnostic modality in these individuals; but the latter technique is not as widely available.

Any decision to obtain BMD evaluation should take into consideration the resident's wishes, his or her overall clinical condition, treatment goals, prognosis, and life expectancy. However, extreme old age should not exclude a resident who has risk factors for osteoporosis from being offered BMD evaluation if such evaluation is available and feasible.

Step 4. Assess the resident's function and osteoporosis-related disabilities. Residents with obvious skeletal deformity should be assessed to determine functional capabilities and limitations as well as disabilities, including pain and risk of falling. Evaluate patients with pain to determine the nature, severity, location, and cause of pain.

It is important to consider whether the patient has underlying depression or is on appetite-suppression medications. Also look at whether physical barriers (eg, arthritis, hemiplegia, poor eyesight, lack of hand-eye coordination, need for feeding assistance) interfere with the resident's ability to obtain proper nutrition. Such barriers also may affect participation in exercise programs.

Treatment

Step 5. Determine whether treatment of existing osteoporosis is indicated. The choice of interventions is influenced by the resident's risk factors, overall condition and prognosis, general care preferences, values, advance directives, and contraindications to specific therapies.

Some residents may be unable to comply with instructions for taking certain medications or may be unable to tolerate a medication's side effects. Other patients may have end-stage conditions.

The National Osteoporosis Foundation recommends the following approach to osteoporosis treatment in men and women:

- Counsel all patients on nutrition and reduction of risk factors
- Initiate therapy for BMD T-scores < 1.5 if other risk factors are present
- Initiate therapy for BMD T-scores < 2.0 in the absence of other risk factors
- Initiate therapy without BMD testing in patients aged over 70 years who have multiple risk factors

Most elderly residents cannot meet their calcium and vitamin D requirements through diet alone; thus, supplementation usually is required.

Step 6. Provide appropriate nonpharmacologic interventions. Calcium and vitamin D supplementation may retard bone loss. Most elderly residents cannot meet their calcium and vitamin D requirements through diet alone; thus, supplementation usually is required. Decreased exposure to sunlight, decreased hydroxylation, renal insufficiency, and various medications can contribute to reduced vitamin D levels.

Assess the resident's current diet to identify the need for supplementation. As appropriate, the practitioner should prescribe calcium supplementation at dosages sufficient to raise daily calcium intake to 1,500 mg/daily from all sources for all persons over age 65 (1,000 mg/daily for women who are taking supplemental estrogen). A common side effect of calcium supplementation is constipation.

Vitamin D requirements for older adults are now thought to be 800 to 1,000 IU/daily. A common supplement regimen is calcium carbonate or calcium citrate 500 mg t.i.d. or 600 mg b.i.d. plus vitamin D 800 to 1,000 IU/daily.

Supplemental calcium and vitamin D, as well as lifestyle modifications to address risk factors, are recommended for men who have or are at risk for osteoporosis. Oral alendronate is recommended if clinically appropriate.

Exercise is most beneficial for residents with osteoporosis for increasing mobility, muscle mass, and strength and balance, as well as for preventing falls. Customize activities and exercise, including weight-bearing activities as tolerated, for each resident.

Other lifestyle interventions that may help prevent the onset or progression of osteoporosis include smoking cessation and reducing or eliminating alcohol and caffeine intake.

A number of interventions can be implemented to help prevent osteoporosis-related fractures. These include:

- Adequate dietary intake with optimal calcium and vitamin D supplementation
- Fall prevention strategies, including gait and balance training, where indicated

Table 3.
Medications to Prevent and Treat Osteoporosis

Medication	Trade Name	Approved Indication	Dosage	Concerns/Precautions in Long-term Care Setting
Bisphophonates				
Alendronate	Fosamax	• Treatment and prevention of postmenopausal osteoporosis (PMO) and treatment of glucocorticoid-induced osteoporosis (GIO) • Treatment of osteoporosis in men	Treatment: 10 mg/d; 70 mg/wk Prevention: 5 mg/d; 35 mg/wk	Precautions: • Active gastritis, duodenitis, or ulcer • Creatinine clearance <35 cc/min/1.73m^2 • Esophageal stricture or motility dysfunction • Hypocalcemia • Poor pill-swallowing ability May cause esophageal or gastric inflammation or ulcers Give in the morning on an empty stomach with 8 oz water Factors influencing administration: • Ability to drink 8 oz of water • Ability to sit or stand upright for at least 30 min after ingestion • Ability to take alendronate 30 to 60 min before meals and morning dosing of other medications Patients with severe dementia or kyphosis may be unable to sit or stand upright for 30 min after ingestion
Risedronate	Actonel	Treatment and prevention of PMO and GIO	5 mg/d; 35 mg/wk	Do not use if any of the following is present: • CrCl<30ml/min/1.73m^2 • Hypersensitivity to any product component • Hypocalcemia • Inability to sit or stand upright for 30 min May cause upper gastrointestinal irritation Administration requirements as for alendronate
Calcitonin (nasal spray)	Miacalcin	Treatment of PMO in women >5 y post menopause	One intranasal spray daily (200 IU), alternating nostrils	Do not use if hypersensitivity to any product is present May cause rhinitis Use with caution in patients with sinus problems Improves bone pain (eg, caused by acute fracture)
Raloxifene (selective estrogen receptor modulator)	Evista	Prevention and treatment of osteoporosis	60 mg/d	Precautions: • May cause hot flushes • Increased risk of venous thromboembolism (avoid in patients with history of DVT or PE) Inadequate information available on use in long-term care setting
Teriparatide (parathyroid hormone)	Forteo	Treatment of severe osteoporosis in men and women with PMO who are at high risk for fracture and intolerant to other osteoporosis therapy	20 mcg/d subcutaneously into thigh or abdominal wall	Contraindications: • Paget's disease • Hyperparathyroidism • Bone cancer or radiation to bone • Vitamin D deficiency • Multiple kidney stones • Recent diagnosis of breast or prostate cancer
Hormone replacement therapy (estrogen or estrogen/progesterone	Various preparations	Prevention (depending on product) of PMO	Variable depending on product and patient preference	Increased risk of: • Venous thromboembolism in immobile patients (avoid in patients with history of DVT or PE) • Invasive breast cancer • Myocardial infarction, stroke (combined HRT) May cause breast tenderness or vaginal bleeding Inadequate information available on use in long-term care setting

- Range of motion exercise in non-ambulatory residents, when possible
- Reduction in dosage or discontinuation of medications that predispose to osteoporosis or increase the risk of falling
- Regular weight-bearing exercise where feasible

Step 7. Is pharmacologic intervention indicated to improve bone density or prevent further bone loss? Several pharmacologic treatment options are now available both to prevent the development of osteoporosis and to treat established osteoporosis (Table 3).

Pharmacologic interventions should be individualized, taking into consideration the clinical situation and resident or family wishes and values. Because preventive measures make take months to years to decrease fracture risk, the resident's overall prognosis also should be considered.

In addition to the individual therapies listed in Table 3, combination therapy is another option. For instance, many women start Hormone Replacement Therapy (HRT) after substantial bone loss already has occurred. They may continue to lose bone despite longstanding hormone therapy. The combined use of HRT and bisphosphonates is gaining acceptance and may be useful in situations where BMD continues to decline or fragility fractures occur in patients who are taking HRT.

Step 8. Treat symptoms related to skeletal deformity. Chronic pain caused by osteoporosis or its complications may be treated by local modalities, analgesics, and calcitonin.

Acute back pain caused by an osteoporotic vertebral compression fracture is best treated by two days of bed rest, analgesics, and calcitonin, followed by a program of mobilization and exercise to retain or improve muscle strength and mobility.

Extensive use of back braces may increase discomfort and contribute to disuse of back extensor muscles. A kypho-orthosis may be of some benefit, but this device may be poorly tolerated and cause sores from trauma to frail skin.

Step 9. Institute measures to improve function and try to prevent serious complications. Falls are a major cause of complications—such as fractures—in osteoporotic residents. Therefore, it is important to implement measures to prevent or reduce falls. These include:

- Ensuring that lighting is adequate, especially at night
- Installing handrails in bathrooms and hallways
- Ensuring that floor coverings are not loose or slippery
- Reducing clutter in rooms and hallways to allow cognitively impaired individuals to ambulate safely
- Using beds that are low to the floor and floor pads that provide cushioning when a patient falls out of bed

Options for rehabilitative and restorative interventions include weight-bearing and muscle-strengthening exercise as tolerated by the resident.

Hip protectors may be used to absorb and shunt energy away from the proximal femur, although studies regarding the effectiveness of these devices have produced conflicting results.

Monitoring

Step 10. Periodically assess, monitor, and document the resident's progress. If feasible, obtain objective measurements of the resident's symptoms and overall course at least every 3 to 6 months. Such indications include objective pain scales, measure of function and dependency in activities of daily living, and indicators of strength and mobility.

The National Osteoporosis Foundation recommends obtaining BMD by central DEXA every two years to monitor the effect of therapy. Assessment of BMD at peripheral sites should not be used to monitor the effect of osteoporosis therapy. Residents who are taking high-dose steroids may require more frequent assessment of BMD because of high bone turnover.

Step 11. Is the resident tolerating the medication regimen prescribed to prevent or treat osteoporosis? Monitor the resident for side effects of osteoporosis treatments. Calcium supplements may cause constipation and other gastrointestinal complaints. Calcitonin may cause nasal irritation. Alendronate or risedronate may cause increased heartburn, esophageal irritation, musculoskeletal pain, and other symptoms. It is important to note such symptoms and ensure that they are addressed accordingly.

If the resident cannot tolerate the prescribed regimen, the practitioner should consider an alternative approach. Hopefully, a regimen can be identified that controls symptoms, prevents disease progression, and is acceptable to the resident.

Summary

Osteoporosis is common among ALF residents and should be identified and treated promptly to slow, stop, or even reverse bone loss and to prevent falls, fractures, and other complications of the condition. Facility staff, practitioners, family members, and the resident need to work together to determine if osteoporosis is present (or the resident is at risk for osteoporosis) and what interventions may be most beneficial.

It is important for everyone to remember that osteoporosis can be present without symptoms such as pain; so facilities should ensure residents are assessed for osteoporosis and their risk for the condition even if they don't have any obvious signs of the disease. Residents and caregivers alike should be educated about the importance of treatment adherence and the need to watch for side effects.

Unlike many conditions that are common in the senior population, osteoporosis can be successfully managed and even reversed. The result of effectively addressing the condition is that residents are able to stay independent and functional longer and maintain their quality of life. ALC

If you would like to order the AMDA CPG on osteoporosis and/or other AMDA clinical practice guidelines, CPG tool kits, or CPG applications for PDAs, see the organization's Web site at www.amda.com.