The Elderly Woman and Osteoporosis

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Abstract

Osteoporosis is a significant health problem among elderly women, but one that is 30 or more years in development. Through preventive actions, the development of significant levels of osteoporosis in such major bones as the hip can all but be eliminated. The occurrence of hip fractures resulting from osteoporosis impact older women throughout the world, but are of major concern in developed countries such as the United States and Germany where the proportion of elderly in the population increases steadily.

Introduction

Osteoporosis, a painful and debilitating disease, affects more than 25 million Americans - both male and female. In the United States, osteoporosis is estimated to cause more than 1.5 million fractures annually. According to Germano (1999), the risk of hip fracture in older women is greater than the risk of all female cancers combined. The social cost of osteoporosis is staggering: approximately $14 billion each year. Prevention of osteoporosis should be a high priority, since the treatment of this established disease remains sub-optimal (Wark, 1996). Though some risk factors cannot be prevented or modified (i.e., family history, past fracture, and vision loss), these risk factors can identify risk groups who are amenable to drug therapy or to preventive measures such as protective hip pads or environmental changes (Lips, 1997).

The three most common sites of fractures are the vertebrae, the hip, and the wrist. Hwagn, Glass and Molter (1999) wrote that hip fractures are considerably more serious, because they cause death and disability. Only one-third of patients with hip fractures are able to regain the degree of independence that they had prior to their injury.

Durward, Pugh, Ogenremi, Cottee, and Patel (1999) recommend that risk factors related to falls be assessed in elderly females referred for bone-density tests by family physicians to define hip fracture risk more precisely. This additional identification of patients at high risk of hip fractures enables targeted patient management to provide strategies to decrease the risk of falls, even in females with good hip-bone density.

As the number of older Americans increases, the number of fall-related injuries and resulting deaths is most likely to increase. Both the incidence of falls and severity of complications increase with age. Injury is the fifth leading cause of death in older adults, and most of these fatal injuries are related to falls. In the United States, falls, occurring primarily among older adults, were the second leading cause of deaths due to unintentional injuries in 1994 (Rivara, 1997).

In an epidemiological study in a well-defined white population of Finland, Kannus, et al. (1999) sought to determine the trends in the number and incidence of fall-induced injuries and deaths of older adults aged 50 or older. In the study period of 1971-1995, total fall-induced injuries increased from 5,622 (1970) to 21,574 (1995), a 284% increase. The age-adjusted incidence also increased in both females (from 648 [1970] to 1,469 [1995], a 127% increase) and males (from 434 [1970] to 972 [1995], a 124% increase). The number of deaths due to falls in the overall population showed a 80% increase.

B.L. McClung (1999) emphasizes that detecting fracture risk and preventing fractures through comprehensive evaluation and treatment are key intervention strategies. Injury prevention includes identifying correctable risk factors and treating at-risk patients with pharmacologic and nonpharmacologic therapies.

In the literature, there is extensive documentation of the characteristics that predispose the individual to falls. Hwang, Glass, and Molter (1999) and Tawsky (1998) provide contributing factors related to the risk of falls and injuries in the elderly: advancing age; medications that affect balance or alertness; poor vision, poor hearing; impaired muscle strength, flexibility, or reflexes; disease that affect balance; osteoporosis; dementia; fear of falling; alcohol; medical diseases; inappropriate footwear; low body weight; poor nutrition status; poor lighting; flooring; obstacles in the pathway; furniture height; stairs and steps; lack of grab bars and railings.

Both articles offer recommendations to prevent falls in the elderly: remove loose wires/cords; remove throw rugs; all rugs should be anchored and smooth; install grab bars in tubs/showers; install non-skid tape or rubber mats in tubs/showers and in kitchens near the sink/stove; make sure all hand rails on stairways are secure; provide good lighting; wear sturdy, rubber-soled shoes; remove clutter from stairs; place nightlight or flashlight at bedside; put frequently used items at shoulder to knee height.

M. R. McClung (1999) wrote that recent data demonstrate that bone mass density (BMD) is not the only determinant of fracture risk. He urged that therapy-related suppression of bone turnover, strength, balance, the likelihood of falls and injuries, and bone quality (not necessarily revealed in BMD measurements) may be contributing factors in the body's response to drug therapy for osteoporosis. He discussed the recent research being done on the use of raloxifene as an effective treatment in reducing fractures related to osteoporosis.

Ullom-Minnich (1999) provides a thorough table of risk factors for fractures; an algorithm for the management of patients at risk for osteoporotic fractures; and a table listing comparative effects of pharmacological prevention of fractures. Walker (1998) provides several conditions, along with osteoporosis, that are contributing risk factors that increase the risk of falling and occurrence of a fracture.

Based on cost-effectiveness data and clinical efficacy, he recommended that calcium and vitamin D be the first-line treatment for patients at risk for fractures. The cost would be less than one-thousand dollars for every fractures prevented.

Sattin (1997) suggested that to understand prevention and control of fractures, it is necessary to view injuries as a problem in medical etiology (a relationship between a person, an agent, and the environment). Injury-prevention can focus on changing host-related factors by tackling osteoporosis, chronic disease, impaired gait and balance, medication use, poor vision, and impaired cognitive function.

Tibbitt (1996) stated that host factors that reduce injuries are related to the management of osteoporosis. These host factors included calcium, vitamin D, estrogen replacement, among others.

Kannus (1999) wrote that regular exercise is probably the only method that may prevent osteoporotic fractures -- by preventing both osteoporosis and falls. Both human and animal studies have shown that physical activity can increase bone density, mass and strength. The starting age of exercise is critical, because the benefit to bone is doubled if exercise is initiated before or at puberty.

Nevertheless, the bone preserving action of exercise during adulthood can help maintain bone strength and prevent osteoporotic fractures. The literature suggests that impact exercise can best improve bone strength. In older adults, climbing up and down stairs, brisk walking, dancing, and adult-age gymnastics and calisthenics are appropriate.

In fact, weight-bearing exercise seems to be the most protective. Cummings et al. (1995) cites a number of studies that show a decline in fracture risk with exercise, particularly walking. Katz and Sherman (1998) suggest that walking and weight-bearing exercises should raise the heart rate enough to improve aerobic conditioning. Patients should walk at this level for at least 15-20 minutes 3-4 times per week. Patients without bone loss or other medical problems can run, do high-impact aerobics, or use rowing machines if they so desire.

Warren and Sherman (1998) recommend that elderly patients who are unaccustomed to physical activity should avoid running because of the risk of falls and possible injury to the spine and weight-bearing bone due to impact. Even in the old and very frail elderly people, exercise and regular activity can improve gait, balance, coordination, reaction time, and muscle strength. The best combination seems to be vigorous past activity (in younger years) and moderate recent activity (vigorous activity in old age may increase the chances of falling injuries) (Kannus, 1999).

Layne and Nelson (1999) reviewed the results of both longitudinal research and cross-sectional research over the past ten years investigating the effects of resistance training on bone in adult women and men. Both aerobic and resistance training provide weight-bearing stimulus to bone. They conclude that resistance training is positively associated with high BMD in both young and older adults and that the effects of resistance exercise is fairly site specific to working muscles and the bones to which they are attached.

Rawsky (1998) stated the emphasis is on improving speed and muscle strength for both the upper and lower extremities. The goal is an increased speed of contractile responses of muscles resulting in a reduced occurrence of falls.

Regarding pharmacologic treatment, O'Connell (1999) report that currently, no drugs exist to promote new bone formation. For prevention of osteoporosis, drugs include supplemental calcium and vitamin D, hormone replacement therapy, and alendronate. For the treatment of osteoporosis, drugs include hormone replacement therapy, alendronate, and nasal calcitonin. The prevention and treatment plan is individualized for each patient.

Winslow and Jacobson (1998) reported a study conducted by a team of physicians, registered nurses, and physical therapists at Yale University. The prospective, random study (n=301) used an individual, multiple-risk-factor intervention strategy that significantly reduced the risk of falling among elderly people living at home.

In an epidemiologic study of elderly conducted by Nguyen, Eisman, Kelly, and Sambrock (1996), they reported the overall incidence of fractures was 220 fractures per 10,000 person-years. Higher risk of fracture was associated with lower femoral neck bone BMD, quadriceps weakness, higher body sway, falls in the preceding 12 months, a history of fractures in the previous five years, lower body weight, and shorter current height.

Turner, Fu, Taylor, and Wang (1998) conducted a study of women ages 50 and older who resided in households interviewed for the NHANES III, Phase 1 study. Strong risk factors predicting osteoporotic fractures included: race (white females are at a greater risk for fractures than Black or Hispanic females), low BMI, heredity, and inactivity. The recommendations included the screening of high-risk females, achieving healthy body weights for underweight females, and the need for prevention interventions that target women earlier in their lives. Current and previous research point to the critical need to target women earlier in their lives. Health education and intervention should inform young women of the risks of osteoporotic fractures. Interventions in younger years should address maintenance of healthy body weights, nutrition education, smoking cessation, and physical activity for osteoporosis and fracture prevention.

Web Sites

Readers might to review the web sites listed below that have excellent information and reports related to osteoporosis.

National Osteoporosis Foundation: www.nof.org/osteoporosis.htm

This foundation is a great resource for information pertaining to Osteoporosis and the Elderly. Its mission is dedicated to reducing the widespread incidence of osteoporosis, a condition seen most often in older women.

The National Osteoporosis Foundation reports that 8 million American women and 2 million men have osteoporosis, and millions more have low bone density. Osteoporosis is a risk for all ethnic populations, especially in the elderly population. Symptoms include severe back pain, loss of height, or spinal deformities. It is often diagnosed when bumps or falls contribute to a broken bone. The two most important risk factors are being women and advanced age. The document also reports on prevention which include a balanced diet rich in calcium and vitamin D, weight bearing exercise, no smoking or excessive alcohol use, and bone density testing.

Osteoporosis is responsible for more than 1.5 million fractures annually. These fractures include: 300,000 hip fractures, 700,000 vertebral fractures, 250,000 wrist fractures, and 300,000 fractures at other sites. Approximately 300,000 Americans aged 45 and over in 1991 were admitted to the hospital for hip fractures in which osteoporosis was the underlying cause. An average of 24% of hip fracture patients age 50 and over die in the year following their fracture. White women have twice the incidence rate of fractures than African Americans. Treatment for osteoporosis and related injuries are approximated at 13.8 billion dollars annually.

National Institute of Arthritis and Musculoskeletal and Skin Disease: www.nih.gov.niams/reports/bnhrtsm.htm

Dr. Ethel S. Siris, Professor of Clinical Medicine at Columbia University College of Physicians and Surgeons in New York City states osteoporosis causes 1.3 million fractures of the wrist, vertebrae, and hips a year. Elderly people who break their hips are more likely to end up in a nursing home in the proceeding year, and have a 20% death rate. Osteoporosis can also lead to deformity of the spine, chronic back pain, and a loss of height.

The National Institute of Arthritis and Musculoskeletal and Skin Disease reports that there are connections between cardiovascular disease and osteoporosis. These preliminary results suggest a connection between osteoporosis and risk of mortality from cardiovascular disease. The report suggests that further studies need to take place to find the connection.

In work with animals, there seems to be a parallel between bone and vascular tissue. It seems that both these cell types respond to hormones and appear to develop through the effects of inflammatory mediators.

This report does state that is there further need to research this area and that most of the evidence available at this time is suggestive, rather than definitive.

National Center for Health Statistics & Center for Disease Control and Prevention: www.cdc.gov/nchs/data/hus99.pdf

Osteoporosis is a contributing factor to disabilities among the elder population. Hip fractures were responsible for 300,000 hospitalizations for the elderly population, mostly women, in 1996. About 90% of women and 54% of men over 85 years old had measurable reduced hip bone density. Non-Hispanic white women are twice as likely as non-Hispanic black women to acquire osteoporosis.

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