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Osteoporosis: A Review.

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ABSTRACT

Osteoporosis is a disease where decreased bone strength increases the risk of a broken bone. It is the most common reason for a broken bone among people who are older. Bones that commonly break include the back bones, the bones of the forearm, and the hip. Until a broken bone occurs there are typically no symptoms. While osteoporosis occurs in people from all ethnic groups, European or Asian ancestry predisposes for osteoporosis. Osteoporosis is an age-related disorder that causes the gradual loss of bone density and strength. Conventional radiography is useful, both by itself and in conjunction with CT or MRI, for detecting complications of osteopenia (reduced bone mass; preosteoporosis). Lifestyle prevention of osteoporosis is in many aspects the inverse of the potentially modifiable risk factors.

Keywords: osteoporosis,osteopenia,osteomalasia,bone density, hormone , calcium supplement

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INTRODUCTION

Osteoporosis is a disease where decreased bone strength increases the risk of a broken bone. It is the most common reason for a broken bone among people who are older. Bones that commonly break include the back bones, the bones of the forearm, and the hip. Until a broken bone occurs there are typically no symptoms. Bones may weaken to such a degree that a break may occur with minor stress or spontaneously. Chronic pain and a decreased ability to carry out normal activities may occur following a broken bone.

DEFINITION

The word osteoporosis literally means "porous bones." Is a chronic ,progressive metabolic bone disease characterized by low bone mass and structural deterioration of bone tissue leading to increased bone fragility [1].

RISK FACTORS

NON MODIFIABLE

Bone density peaks at about 30 years of age. Women lose bone mass more rapidly than men.

- The most important risk factors for osteoporosis are older age are most affected (in both men and women) and female sex; estrogen deficiency following menopause or bone mineral density, while in men, a decrease in testosterone levels has a comparable (but less pronounced) effect [2].

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- Race: While osteoporosis occurs in people from all ethnic groups, European or Asian ancestry predisposes for osteoporosis.
- Heredity: Those with a family history of fracture or osteoporosis are at an increased risk; the heritability of the fracture, as well as low bone mineral density, are relatively high, ranging from 25 to 80%. At least 30 genes are associated with the development of osteoporosis.
- Those who have already had a fracture are at least twice as likely to have another fracture compared to someone of the same age and sex. Early menopause/hysterectomy is another predisposing factor.
- Build: A small stature is also a non modifiable risk factor associated with the development of osteoporosis [4].

POTENTIALLY MODIFIABLE

- **Excess consumption of alcohol**: Although small amounts of alcohol are probably beneficial (bone density increases with increasing alcohol intake), chronic heavy drinking (alcohol intake greater than three units/day) probably increases fracture risk despite any beneficial effects on bone density.
- **Vitamin D deficiency**: Low circulating Vitamin D is common among the elderly worldwide. Mild vitamin D insufficiency is associated with increased parathyroid hormone (PTH) production. PTH increases bone resorption, leading to bone loss. A positive association exists between serum 1,25-dihydroxycholecalciferol levels and bone mineral density, while PTH is negatively associated with bone mineral density.
- **Tobacco smoking:** Many studies have associated smoking with decreased bone health, but the mechanisms are unclear. Tobacco smoking has been proposed to inhibit the activity of osteoblasts, and is an independent risk factor for osteoporosis. Smoking also results in increased breakdown of exogenous estrogen, lower body weight and earlier menopause, all of which contribute to lower bone mineral density.
- **Malnutrition:** Nutrition has an important and complex role in maintenance of good bone. Identified risk factors include low dietary calcium and/or phosphorus, magnesium, zinc, boron, iron, fluoride, copper, vitamins A, K, E and C (and D where skin exposure to sunlight provides an inadequate supply). Excess sodium is a risk factor. High blood acidity may be diet-related, and is a known antagonist of bone.
- **Underweight/inactive:** Bone remodeling occurs in response to physical stress
- **Endurance training:** In female endurance athletes, large volumes of training can lead to decreased bone density and an increased risk of osteoporosis especially in the elderly and in females. Higher cadmium exposure results in osteomalacia (softening of the bone)
- **Soft drinks:** Some studies indicate soft drinks (many of which contain phosphoric acid) may increase risk of osteoporosis, at least in women. Others suggest soft drinks may displace calcium-containing drinks from the diet rather than directly causing osteoporosis.

SIGNS AND SYMPTOMS

- Osteoporosis is an age-related disorder that causes the gradual loss of bone density and strength.
- When the thoracic vertebrae are affected, there can be a gradual collapse of the vertebrae. This results in kyphosis, an excessive curvature of the thoracic region.
- Osteoporosis itself has no symptoms; its main consequence is the increased risk of bone fractures. Osteoporotic fractures occur in situations where healthy people would not normally break a bone; they are therefore regarded as fragility fractures.

DIAGNOSTIC EVALUATION

- Conventional radiography is useful, both by itself and in conjunction with CT or MRI, for detecting complications of osteopenia (reduced bone mass; preosteoporosis), such as fractures; for differential diagnosis of osteopenia; or for follow-up examinations in specific clinical settings, such as soft tissue calcifications, secondary hyperparathyroidism, or osteomalacia in renal osteodystrophy
- Dual-energy X-ray
- Dual-energy X-ray absorptiometry (DXA)
- Quantitative computed tomography
- Quantitative ultrasound [3]

PREVENTION

Lifestyle prevention of osteoporosis is in many aspects the inverse of the potentially modifiable risk factors. As tobacco smoking and high alcohol intake have been linked with osteoporosis, smoking cessation and moderation of alcohol intake are commonly recommended as ways to help prevent it. It includes multifaceted regimen of diet habit to prevent further bone fracture

NUTRITION

The USPSTF did not recommend low dose supplementation (less than 1 g of calcium and 400 IU of vitamin D) in postmenopausal women as there does not appear to be a difference in fracture risk. It is unknown what effect higher doses have. Vitamin K deficiency is also a risk factor for osteoporotic fractures. The gene gamma-glutamylcarboxylase (GGCX) is dependent on vitamin K. Functional polymorphisms in the gene could attribute to variation in bone metabolism and BMD.

MANAGEMENT

Lifestyle

Weight-bearing endurance exercise and/or exercises to strengthen muscles improve bone strength in those with osteoporosis. Aerobics, weight bearing, and resistance exercises all maintain or increase BMD in postmenopausal women. Fall prevention can help prevent osteoporosis complications. There is some evidence for hip protectors specifically among those who are in care homes [4].

MEDICATIONS

Bisphosphonates are useful in decreasing the risk of future fractures in those who have already sustained a fracture due to osteoporosis. This benefit is present when taken for three to four years. They have not been compared directly to each other, though, so it is not known if one is better. Fracture risk reduction is between 25 and 70% depending on the bone involved. There are concerns of atypical femoral fractures and osteonecrosis of the jaw with long term use, but these risks are low Half stop their medications within a year. Fluoride supplementation does not appear to be effective in postmenopausal osteoporosis, as even though it increases bone density, it does not decrease the risk of fractures.

Teriparatide (a recombinant parathyroid hormone) has been shown to be effective in treatment of women with postmenopausal osteoporosiss. Calcitonin while once recommended is no longer due to the associated risk of cancer with its use and questionable effect on fracture risk.

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