

An Overview on Osteoporosis and its Management

BISWAJIT BHUNIA

Associate Professor

Government Physical Education College for Women, Chinsurah, Dist.-Hooghly (W.B.) India

ABSTRACT

Osteoporosis is a bone disease that develops when bone mineral density and bone mass decreases, or when the structure and strength of bone changes. This can lead to a decrease in bone strength that can increase the risk of fractures, broken bones. Although it is seen in all age groups, gender, and races, it is more common in elder people and woman. It was estimated that 50% women and 20% of men over the age of 50 years will have an osteoporosis-related fracture in their remaining life. These fractures are responsible for impaired quality of life, and gradually increased mortality. Presently osteoporosis is increasingly becoming a global epidemic. Currently, it has been estimated that more than 200 million people are suffering from osteoporosis. According to recent statistics from the International Osteoporosis Foundation, worldwide, 1 in 3 women over the age of 50 years and 1 in 5 men will experience osteoporotic fractures in their lifetime. Generally Men and women between the ages of 18 and 50 need 1,000 milligrams of calcium a day. This daily amount increases to 1,200 milligrams when women turn 50 and men turn 70, inadequate supply can causes osteoporosis. In connection with this Vitamin D improves the body's ability to absorb calcium and improves bone health in other ways. People can get some of their vitamin D from sunlight, but this might not be a good source if person live in high latitude, if a person housebound, or if a person regularly use sunscreen or avoid the sun because of the risk of skin cancer. However, exercise can help a person build strong bones and slow bone loss. However, researchers found that exercise will benefit a person's bones no matter when he/she starts, but he/she will gain the most benefits if he/she starts exercising regularly when he/she is young and continue to exercise throughout his/her life. A person should combine strength training exercises with weight-bearing and balance exercises. Strength training helps strengthen muscles and bones in person's arms and upper spine. Weight bearing exercises such as walking, jogging, running, stair climbing, skipping rope, skiing and impact-producing sports affect mainly the bones in person's legs, hips and lower spine. Balance exercises can reduce person's risk of falling especially as he/she gets older. A regular weight bearing exercise regimen such as walking 30–40 min per session along with back and posture exercises for a few minutes on most days of the week should be advocated throughout life. Children and young adults who are active reach a higher peak bone mass than those who are not. Among older patients, these exercises help slow bone loss attributable to disuse, improve balance, and increase muscle strength, ultimately reducing the risk of falls. Patients should avoid forward flexion, side-bending exercises, or lifting heavy objects because pushing, pulling, lifting, and bending activities compress the spine, leading to fractures. Moreover, Osteoporosis can be diagnosed and prevented with effective treatments, before fractures occur. Postmenopausal women and men aged 50 years and above having severe osteoporosis must be considered for treatment:

Key Words : Osteoporosis, Calcium, Cancer, Muscles, Bones

INTRODUCTION

Osteoporosis is a common and silent disease until it is complicated by fractures that become common. It was estimated that 50% women and 20% of men over the

age of 50 years will have an osteoporosis-related fracture in their remaining life (NIH, 2001; Cosman *et al.*, 2015; Cooper *et al.*, 1992; Reginster and Burlet, 2006). These fractures are responsible for lasting disability, impaired

quality of life, and increased mortality, with enormous medical and heavy personnel burden on both the patient's and nation's economy (Wright *et al.*, 2014; Riggs *et al.*, 1982; Compston *et al.*, 2013). However, exercises can help a person to build strong bone, slow bone loss and prevent osteoporosis. Osteoporosis can be diagnosed and prevented with effective treatments, before fractures occur. Therefore, the prevention, detection, and treatment of osteoporosis should be a mandate of primary healthcare providers (Watts *et al.*, 2010; Tuzun *et al.*, 2012; Hannan *et al.*, 2000).

Observation:

It was estimated that the number of patients worldwide with osteoporotic hip fractures is more than 200 million. It was reported that in both Europe and the United States, 30% women are osteoporotic, and it was estimated that 40% post-menopausal women and 30% men will experience an osteoporotic fracture in the rest of their lives. The incidence rate for hip fracture increases exponentially with age in all countries. It was estimated that around the age of 50 years, the probability of having a hip fracture in the remaining lifetime was 3.5% in men and 14.6% in women. Bone tissue is continuously lost by resorption and rebuilt by formation; bone loss occurs if the resorption rate is more than the formation rate. The bone mass is modeled i.e. grows and takes its final shape from birth to adulthood: bone mass reaches its peak at puberty; subsequently, the loss of bone mass starts. Peak bone mass is largely determined by genetic factors, health during growth, nutrition, endocrine status, gender, and physical activity. Bone remodeling, which involves the removal of older bone to replace with new bone, is used to repair microfractures and prevent them from becoming macrofractures, thereby assisting in maintaining a healthy skeleton. Menopause and advancing age cause an imbalance between resorption and formation rates (resorption becomes higher than absorption), thereby increasing the risk of fracture. Certain factors that increase resorption more than formation also induce bone loss, revealing the microarchitecture. Individual trabecular plates of bone are lost, leaving an architecturally weakened structure with significantly reduced mass; this leads to an increased risk of fracture that is aggravated by other aging-associated declines in functioning. Increasing evidence suggests that rapid bone remodeling (as measured by biochemical markers of bone resorption or formation) increases bone fragility and risk of fracture.

There are factors associated with an increased risk of osteoporosis-related fractures. These include general factors that relate to aging and sex steroid deficiency, as well as specific risk factors such as use of glucocorticoids (which cause decreased bone formation and bone loss), reduced bone quality, and disruption of microarchitectural integrity. Fractures result when weakened bone is overloaded, often by falls or certain daily chores. However, Osteoporosis can be classified into two main groups by considering the factors affecting bone metabolism: Primary osteoporosis and Secondary osteoporosis.

Discussion:

Osteoporosis causes bones to become weak and brittle — so brittle that a fall or even mild stresses such as bending over or coughing can cause a break. Osteoporosis-related breaks most commonly occur in the hip, wrist or spine. Bone is living tissue that is constantly being broken down and replaced. Osteoporosis occurs when the creation of new bone doesn't keep up with the loss of old bone. Osteoporosis affects men and women of all races. But white and Asian women, especially older women who are past menopause, are at highest risk. Medicines, healthy diet and weight-bearing exercise can help prevent bone loss or strengthen already weak bones. Osteoporosis is more common in people who have too much or too little of certain hormones in their bodies such as Lowered sex hormone levels tend to weaken bone. The fall in estrogen levels in women at menopause is one of the strongest risk factors for developing osteoporosis. Treatments for prostate cancer that reduce testosterone levels in men and treatments for breast cancer that reduce estrogen levels in women are likely to accelerate bone loss. Too much thyroid hormone can cause bone loss. This can occur if a person's thyroid is overactive or if a person takes too much thyroid hormone medicine to treat an underactive thyroid. Osteoporosis has also been associated with overactive parathyroid and adrenal glands. Osteoporosis is more likely to occur in people who have Low calcium intake is a lifelong lack of calcium plays a role in the development of osteoporosis. Low calcium intake contributes to diminished bone density, early bone loss and an increased risk of fractures. Eating disorders is severely restricting food intake and being underweight weakens bone in both men and women. Gastrointestinal surgery is a Surgery to reduce the size of a person's stomach or to remove part of the intestine

limits the amount of surface area available to absorb nutrients, including calcium. These surgeries include those to help a person lose weight and for other gastrointestinal disorders. Long-term use of oral or injected corticosteroid medicines, such as prednisone and cortisone, interferes with the bone-rebuilding process. Osteoporosis has also been associated with medications used to combat or prevent: Seizures, Gastric reflux, Cancer, Transplant rejection. The risk of osteoporosis is higher in people who have certain medical problems, including: Celiac disease, Inflammatory bowel disease, Kidney or liver disease, Cancer, Multiple myeloma, Rheumatoid arthritis. Some bad habits can increase a person's risk of osteoporosis. Examples include: Sedentary lifestyle, People who spend a lot of time sitting have a higher risk of osteoporosis than do those who are more active. Any weight-bearing exercise and activities that promote balance and good posture is good for a person's bones, but walking, running, jumping, dancing and weightlifting seem particularly helpful. Excessive alcohol consumption-regular consumption of more than two alcoholic drinks a day increases the risk of osteoporosis. Use of Tobacco- the exact role tobacco plays in osteoporosis isn't clear, but it has been shown that tobacco use contributes to weak bones. However, while nearly everyone will lose bone over the course of their lifetime; there are several steps a person can take to keep his/her bones healthy. Good nutrition and regular exercise are essential for keeping a person's bones healthy throughout his/her life. Intake of Calcium-Men and women between the ages of 18 and 50 need 1,000 milligrams of calcium a day. This daily amount increases to 1,200 milligrams when women turn 50 and men turn 70. The Good sources of calcium include: Low-fat dairy products, dark green leafy vegetables, canned salmon or sardines with bones, Soy products, such as tofu, Calcium-fortified cereals and orange juice. If a person find it difficult to get enough calcium from his/her diet, should consider taking calcium supplements. However, too much calcium has been linked to kidney stones. Although yet unclear, some experts suggest that too much calcium, especially in supplements, can increase the risk of heart disease. The Health and Medicine Division of the National Academies of Sciences, Engineering, and Medicine recommends that total calcium intake, from supplements and diet combined, should be no more than 2,000 milligrams daily for people older than 50. Vitamin D- Vitamin D improves the body's ability to absorb calcium and improves bone health in other ways.

People can get some of their vitamin D from sunlight, but this might not be a good source if a person live in high latitude, if a person is housebound, or if he/she regularly use sunscreen or avoid the sun because of the risk of skin cancer. Dietary sources of vitamin D include cod liver oil, trout and salmon. Many types of milk and cereal have been fortified with vitamin D. Most people need at least 600 international units (IU) of vitamin D a day. That recommendation increases to 800 IU a day after age 70. People without other sources of vitamin D and especially with limited sun exposure might need a supplement. Most multivitamin products contain between 600 and 800 IU of vitamin D. Up to 4,000 IU of vitamin D a day is safe for most people. Exercise can help a person to build strong bones and slow bone loss. Exercise will benefit a person's bones no matter when he/she start, but he/she will gain the most benefits if he/she start exercising regularly when he/she is young and continue to exercise throughout his/her life. Combine strength training exercises with weight-bearing and balance exercises. Strength training helps strengthen muscles and bones in person's arms and upper spine. Weight-bearing exercises — such as walking, jogging, running, stair climbing, skipping rope, skiing and impact-producing sports — affect mainly the bones in person's legs, hips and lower spine. Balance exercises such as tai chi can reduce a person's risk of falling especially as he/she gets older.

Conclusion:

Osteoporosis can be prevented or treated if a person consumes a diet rich in protein, calcium and vitamin D, stay active and exercise regularly to keep his/her bones strong and to keep a healthy weight, limit alcohol consumption, caffeine and quit smoking. Supplements, medication and surgery may be offered as a treatment from his/her health care provider. Making healthy lifestyle choices is a person's best prevention against chronic diseases such as osteoporosis. Exercise can help a person build strong bones and slow bone loss. However, research works found that exercise will benefit a person's bones no matter when he/she starts, but he/she will gain the most benefits if he/she starts exercising regularly when he/she is young and continue to exercise throughout his/her life. Person should combine strength training exercises with weight-bearing and balance exercises. Strength training helps strengthen muscles and bones in person's arms and upper spine. Weight bearing exercises such as walking, jogging, running, stair climbing, skipping rope,

skiing and impact-producing sports affect mainly the bones in person's legs, hips and lower spine. Balance exercises can reduce person's risk of falling especially as he/she gets older. A regular weight bearing exercise regimen such as walking 30–40 min per session along with back and posture exercises for a few minutes on most days of the week should be advocated throughout life. Children and young adults who are active reach a higher peak bone mass than those who are not. Among older patients, these exercises help slow bone loss attributable to disuse, improve balance, and increase muscle strength, ultimately reducing the risk of falls. Patients should avoid forward flexion, side-bending exercises, or lifting heavy objects because pushing, pulling, lifting, and bending activities compress the spine, leading to fractures. Moreover, Osteoporosis can be diagnosed and prevented with effective treatments, before fractures occur. Postmenopausal women and men aged 50 years and above having severe osteoporosis must be considered for treatment:

REFERENCES

- Compston, J., Bowring, C., Cooper, A., Cooper, C., Davies, C., Francis, R. *et al.* (2013). Diagnosis and management of osteoporosis in postmenopausal women and older men in the UK: National Osteoporosis Guideline Group (NOGG) update 2013. *Maturitas*, **75** : 392–396.
- Cooper, C., Campion, G. and Melton, L.J. (1992). 3rd Hip fractures in the elderly: a world-wide projection. *Osteoporos Internat.*, **2** : 285–289.
- Cosman, F., de Beur, S.J., LeBoff, M.S., Lewiecki, E.M., Tanner, B., Randall, S. *et al.* (2015). Clinician's guide to prevention and treatment of osteoporosis. *Osteoporos Internat.*, **25** : 2359–2381.
- Hannan, M.T., Felson, D.T., Dawson-Hughes, B., Tucker, K.L., Cupples, L.A., Wilson, P.W., *et al.* (2000). Risk factors for longitudinal bone loss in elderly men and women: the Framingham Osteoporosis Study. *J. Bone Miner. Res.*, **15** : 710–720.
- NIH (2001). Consensus Development Panel on Osteoporosis Prevention, Diagnosis, and Therapy. Osteoporosis prevention, diagnosis, and therapy. *JAMA*, **285** : 785–795.
- Reginster, J.Y. and Burlet, N. (2006). Osteoporosis: a still increasing prevalence. *Bone*, **38**(Suppl 1) : S4–S9.
- Riggs, B.L., Wahner, H.W., Seeman, E., Offord, K.P., Dunn, W.L., Mazess, R.B. *et al.* (1982). Changes in bone mineral density of the proximal femur and spine with aging. Differences between the postmenopausal and senile osteoporosis syndromes. *J. Clin. Invest.*, **70** : 716–723.
- Tuzun, S., Eskiyurt, N., Akarirmak, U., Saridogan, M., Senocak, M., Johansson, H. *et al.* (2012). Incidence of hip fracture and prevalence of osteoporosis in Turkey: the FRACTURK study. *Osteoporos Internat.*, **23** : 949–955.
- Wright, N.C., Looker, A.C., Saag, K.G., Curtis, J.R., Delzell, E.S., Randall, S., *et al.* (2014). The recent prevalence of osteoporosis and low bone mass in the United States based on bone mineral density at the femoral neck or lumbar spine. *J. Bone Miner. Res.*, **29** : 2520–2526.
- Watts, N.B., Bilezikian, J.P., Camacho, P.M., Greenspan, S.L., Harris, S.T., Hodgson, S.F. *et al.* (2010). American Association of Clinical Endocrinologists Medical Guidelines for Clinical Practice for the diagnosis and treatment of postmenopausal osteoporosis. *Endocr. Pract.*, **6**(Suppl 3):1–37.
