

Osteoporosis - The Silent Thief

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Osteoporosis is a disease of bones with serious implications on health. It is a bone disorder of elderly especially women, characterised by decreased bone mass and increased susceptibility to fracture.

Osteoporosis is known as silent thief because over the years it slowly and insidiously robs the skeleton of its banked resources causing bone to become fragile; then, it cannot withstand the normal mechanical stress. Osteoporosis is a skeletal disease in which bones become brittle and prone to fracture. A woman's risk of developing an osteoporosis-related hip fracture is equal to her combined risk of developing breast uterine and ovarian cancer. By age 90, one third of all women and 17 percent of men have sustained a hip fracture. It is projected that more than about 50 percent of all osteoporotic hip fractures will occur in Asia by the year 2020. According to World Health Organisation (WHO), Osteoporosis is second only to cardiovascular disease as a global healthcare problem and medical studies show that a 50-year-old woman has similar lifetime risk of dying from hip fracture as from breast cancer.

Arthritis Foundation of India (API) revealed that by the year 2013, India is expected to have over 36 million osteoporosis cases compared to the 26 million recorded in 2003. This means that a million cases would be added each year. Currently, there is an increasing incidence of hip fractures in the developed cities in Asia; 1 out of 4 hip fractures occur in Asia and Latin America, 1 out of 8 males and 1 out of 3 females in India suffers from Osteoporosis, making India one of the largest affected countries in the world. In most Western countries, while the peak incidence of Osteoporosis occurs at about 70-80 years of age, in India it may afflict those 10-20 years younger, at age 50-60.

Meaning: Osteoporosis is a condition characterised by a decrease in the density of bone, decreasing its strength and resulting in fragile bones. Osteoporosis literally leads to abnormally porous bone that is compressible, like a sponge. This disorder of the skeleton weakens the bone and results in frequent fractures (breaks) in the bones.

Incidence: In osteoporosis, peak bone mass is attained between 16-25 years. Women begin to lose bone at the age of 30 years. Among men, bone loss occurs at rate of 0.3 percent of total loss in men per

year; in women rate of bone loss 0.5 percent – 1 percent per year. After menopause in women, bone loss is 2-3 percent per year. It is 8 times more common in women than in men. Numerically, 1 in 2 women and 1 in 8 men are affected. It is more common in the age group of 51-70 years.

Risk Factors for Osteoporosis

Unmodifiable factors

Advanced age: it is common in older people.

Female gender: women are more prone than men because of total bone mass in 10 percent to 25 percent less than among men.

Post menopausal status: in women oestrogen level decreases and this stimulates thyroid gland to secrete calcitonin which suppresses osteoclastic activity.

Long term glucocorticoid therapy: it inhibits the formation of new bone by causing kidney to excrete calcium, decrease the absorption of calcium intake in the intestine.

Race: Asian and whites more common.

Modifiable factors

- ♦ Family history of osteoporosis.
- ♦ Small stature women.
- ♦ Early menopause: before age 45 either naturally, from surgical removal of ovaries as a result of prolonged amenorrhea in younger women.
- ♦ Inadequate vitamin D: mild vitamin D insufficiency is associated with increased parathyroid hormone (PTH) production. PTH increases bone resorption, leading to bone loss.
- ♦ Prolonged use of certain medications: heparin, long acting sedatives, thyroid replacement, antacids, laxatives - the antidepressant medication called selective serotonin inhibitors (SSRIs), the cancer treatment drug methotrexate, anti-seizure medications, proton pump inhibitors and aluminium containing antacids are all associated with an increased risk of osteoporosis.
- ♦ Conditions like anorexia nervosa, bulimia, excessive dieting
- ♦ Cigarette smoking
- ♦ Diet low in calcium

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- ◆ Excessive use of alcohol

Types : Primary osteoporosis occurs with aging not associated with pathological process. Secondary osteoporosis results from drugs, pathologic process. Type 1 (post-menopausal) osteoporosis occurs 15-20 years after menopause. Type 2 (senile) osteoporosis occurs in men and women over the age of 70 years.

Clinical Features: Osteoporosis can be present without any symptoms for decades because osteoporosis doesn't cause symptoms until bone fractures. Therefore, patients may not be aware of their osteoporosis until they suffer a painful fracture. Back pain is also an early feature of osteoporosis. Fractures of the spine (vertebra) can cause severe "band-like" pain that radiates from the back to the sides of the body. Yet another feature is loss of height. The collapse gives individuals a hunched-back appearance of the upper back, often called a "dowagers hump" because it is commonly seen in elderly women. Spinal deformity such as kyphosis hip fractures typically occur as a result of a fall. With osteoporosis, hip fractures can occur as a result of trivial accidents. Hip fractures also may heal slowly or poorly after surgical repair because of poor healing of the bone. One more feature is disability.

Diagnosis : History and physical examination: An X-ray can detect bone loss only after 30 percent of the skeleton has been depleted. 25 percent – 40 percent demineralisation can be seen.

Bone Mineral Density Tests: This is the best way to determine one's bone health. BMD tests can identify osteoporosis, determine your risk for fractures, and measure your response to osteoporosis treatment. The most widely recognised BMD test is called a dual-energy x-ray absorptiometry, or DXA test.

Dual energy x-ray absorptiometry: It measures bone density in hip and knee.

Bone Scans: A bone scan involves injecting the patient with a dye that allows a scanner to identify differences in the conditions of various areas of bone tissue. A bone scan can show the bone changes in bone tissue that may indicate cancer, bone lesions, inflammation, or new fractures.

Lab Tests

Serum calcium levels : These include blood vitamin D levels, thyroid function, parathyroid hormone levels, follicle stimulating hormone (FSH) test to establish menopause status and testosterone levels (in men). Hourly urine collection is done to measure calcium metabolism.

Treatment

Bisphosphonates: Much like estrogen, this group of drugs can inhibit bone breakdown, preserve bone mass, and even increase bone density in your spine and hip, reducing the risk of fractures. Examples of these medications include alendronate (Fosamax), ibandronate (Boniva).

Raloxifene (Evista): This medication belongs to a class of drugs called selective estrogen receptor modulators (SERMs).

Calcitonin: A hormone produced by your thyroid gland, calcitonin reduces bone resorption and may slow bone loss. It may also prevent spine fractures. Salmon Calcitonin is taken 100 units / day, nasal spray - 200 units / day. Medication to be taken with vitamin D.

Teriparatide (Forteo): This powerful drug, an analog of parathyroid hormone, treats osteoporosis in post-menopausal women and men who are at high risk of fractures. It works by stimulating new bone growth

Oestrogen replacement therapy : Estrogens, especially when started soon after menopause, can help maintain bone density. It is given for 21 days with one dose of progesterone added e.g. oestradiol, oestriol and oestrone. Those who take oestrogen treatment should take 1.5 gram of elemental calcium daily, and also 1 or 2 multivitamin containing 400 units of vitamin D.

Prevention of osteoporosis

Diet: Food containing high calcium should be taken. These include cow's milk, curd, cheese, ice-cream, fish and green leafy vegetables like spinach and broccoli.

Calcium intake : Experts recommend that premenopausal women and men consume at least 1000 mg of calcium per day. Postmenopausal women who do not take estrogen should consume 1200 to 1500 mg of calcium per day (total of diet plus supplements). However, one should not take more than 2000 mg calcium per day to avoid side effects. Calcium supplements (calcium carbonate or calcium citrate) may be suggested if you cannot get enough calcium in your diet. Calcium requirement over 500 mg/day should be met in divided doses (eg, once in morning and evening).

Vitamin D intake : Most people consume 800 International Units (IU) of vitamin D each day, which is insufficient to prevent bone loss and fracture rate in older women and men. Exposure to sunlight-20 minutes/day is a good, easily available and free source of vitamin D. Milk is the primary dietary source of dietary vitamin D, containing approximately 100 IU per cup.

Experts recommend vitamin D supplementation for all patients with osteoporosis whose intake of vitamin D is below 400 IU per day. This can be found in a daily multivitamin or a calcium/vitamin D supplement.

Protein supplements: Protein supplements may be recommended in some people to ensure sufficient protein intake. This may be particularly useful for those who already had an osteoporotic fracture.

Alcohol, caffeine, and salt intake: A healthcare provider may recommend limiting the amount of alcohol you drink. Drinking alcohol excessively can increase the risk of fracture due to an increased risk of falling, poor nutrition, etc. It is not clear if restricting caffeine or salt is helpful; these measures have not been proven to prevent bone loss in people who consume an adequate amount of calcium.

Exercise : Weight-bearing exercises can improve bone mass in premenopausal women and help to maintain bone density for women after menopause. The weight bearing exercises such as walking, stair climbing or dancing are best. Physical activity reduces the risk of hip fracture in older women as a result of increased muscle strength. Most experts recommend exercising for at least 30 minutes three times per week. The benefits of exercise are quickly lost if you stop exercising. A regular, weight-bearing exercise regimen that you genuinely enjoy is beneficial over the long term.

Stop smoking: Stopping smoking is strongly recommended if you are at risk for osteoporosis because smoking cigarettes is known to speed bone loss. One study suggested that women who smoke one pack per day throughout adulthood have a 5 to 10 percent reduction in bone density by menopause, resulting in an increased risk of fracture.

Preventing falls : Repeated falling may significantly increase the risk of osteoporotic fractures in older adults. Taking measures to prevent falls can decrease the risk of fractures. Such measures may include the following:

- ♦ Remove loose rugs and electrical cords or any other loose items in your home
- ♦ that could lead to tripping, slipping, and falling.
- ♦ Ensure that there is adequate lighting in all areas inside and around the home, including stairwells and entrance ways.
- ♦ Avoid walking on ice, wet or polished floors, or other potentially slippery surfaces.
- ♦ Avoid walking in unfamiliar areas outside.

Because certain drugs may increase the risk of falls, drug regimens should be reviewed on a regu-

lar basis. In some cases, the healthcare provider may decide to substitute a medication if it has a risk of causing falls. In addition, people with poor vision should see an eye specialist (eg, optometrist or ophthalmologist) for corrective lenses (glasses).

Medication monitoring: Prolonged therapy with and/or high doses of certain medications can increase bone loss. Use of these medications should be monitored by a healthcare provider and decreased or discontinued when possible. Such medications include the following: Glucocorticoid medications (eg, prednisone); Heparin, a medication used to prevent and treat abnormal blood clotting (ie, anticoagulant); Vitamin A and certain synthetic retinoids (eg, etretinate); Certain antiepileptic drugs (eg, phenytoin, carbamazepine, primidone, phenobarbital)

Limit alcohol intake: Regular consumption of 2-3 ounces of alcohol a day may be damaging to bones, even in young women and men. Heavy drinkers are more likely to have bone loss and fractures. This is related to both poor nutrition and increased risk of falling

Consequence of osteoporosis : Osteoporotic bone fractures are responsible for considerable pain. Decreased quality of life, lost workdays, and disability are other consequences. Up to 30 percent of patients suffering a hip fracture will require long-term nursing-home care. Elderly patients can develop pneumonia and blood clots in the leg veins that can travel to the lungs (pulmonary embolism) due to prolonged bed rest after the hip fracture. In addition, once a person has experienced a spine fracture due to osteoporosis, he or she is at very high risk of suffering another such fracture in the near future.

Conclusion

Osteoporosis is a serious problem of bones. However, many of the problems associated with the disease can be significantly minimised by taking remedial measures, in addition to medication.

References

1. Suddarth B. Textbook of Medical Surgical Nursing. 7th edn, Philadelphia: JB Lippincot, 1992
2. Heitkemper L, Obren D. Medical Surgical Nursing. 7th edn, Philadelphia: Mosby Elsevier: 2007
3. <http://www.iofbonehealth.org/facts-and-statistics.html>
4. <http://news.worldsnap.com/health/osteoporosis-affects-a-million-indians-each-year-93932.html>
5. <http://www.mayoclinic.com/health/osteoporosis/DS00128/DSECTION=treatments-and-drugs>
6. http://www.emedicinehealth.com/prevention_of_osteoporosis/page2_em.htm
7. <http://www.osteoporosisindia.com/>
8. <http://www.uptodate.com/contents/patient-information-osteoporosis-prevention-and-treatmentvalproate>
9. <http://www.medicinenet.com/osteoporosis/>