

The Tsunami of Osteoporosis Will Be Coming

Iraj Salehi-Abari^{1,*}, Shabnam Khazaeli², Ali Niksirat³¹Rheumatology Research Center, Amir Alam Hospital, Tehran University of Medical Sciences, Tehran, Iran²Private Sector, Tehran, Iran³Internal Medicine, Tehran University of Medical Science, Tehran, Iran

Email address

salehiabari@sina.tums.ac.ir (I. Salehi-Abari)

To cite this article

Iraj Salehi-Abari, Shabnam Khazaeli, Ali Niksirat. The Tsunami of Osteoporosis Will Be Coming. *Open Science Journal of Clinical Medicine*. Vol. 3, No. 4, 2015, pp. 158-160.

Abstract

Osteoporosis is a bone disease in which low bone mass along with bad quality of bone leads to increased fragility of bone. Bone is a dynamic organ. During growing years, bone remodeling in which bone formation is more than bone resorption can result in peak bone mass (PBM), at the age of 30 ± 5 years. After that, bone remodeling in which bone formation is less than bone resorption results in bone loss. Nowadays TV viewing and cellphone/computer using continue to increase and the time spent in physical activities is declining among teens, youngs and adults. Excess coffee and fast food consumption, excess tobacco using and alcohol intake, are routine bad habits in the world especially among teens and youngers. We know that all of above mentioned items can decrease peak bone mass and increase bone loss. So, corresponding author (ISA) announces that the Tsunami of Osteoporosis will be coming in the future not far.

Keywords

Tsunami, Osteoporosis, BMD Testing, Amir Alam Hospital Guideline

1. Introduction

Osteoporosis is a metabolic disease of bone in which low quantities of bone mass along with bad quality (micro-architectural disruption) of bone leads to increased fragility of bone. Nowadays Dual-energy X-Ray Absorptiometry (DXA) is the gold standard method for diagnosis of osteoporosis (1). DXA machine measures bone mineral content (BMC) in grams and bone area (BA) in square centimeters, then calculates bone mineral density (BMD) by dividing BMC by BA. This machine shows us two other parameters including T-score and Z-score. T-score compares your BMD to the average bone density of young healthy adults of the same gender that is peak bone mass (PBM). Z-score compares your BMD to the average BMD of a person with your same age and gender (2,3). When the t-score is ≥ -1 standard deviation (SD), it means normal BMD. Humans with T-score < -1 SD and > -2.5 SD have Osteopenia. T-score of ≤ -2.5 SD means Osteoporosis (4). For subjects < 50 years by Z-score instead of T-score we can have the same definitions. Bone is dynamic organ. From birth to adulthood the bone modeling by bone resorption and bone formation that are not coupled, results in growth and maturing of

skeleton. In adult skeleton, bone remodeling is responsible for replacement of old tissue by new bone (5). It renews bone tissue and maintains bone mass by bone resorption and formation that are coupled. During growing years of childhood, adolescence, teenage years and early adulthood, the positive balance in bone remodeling unit (BRU) in which bone formation is more than bone resorption, can result in peak bone mass (PBM) at the age of 30 ± 5 years. For a few years after PBM, there is steady-state in BRU due to equilibrium of bone formation and bone resorption and after that negative balance in BRU will be occurred due to bone resorption that is more than bone formation. We know that pathogenesis of Osteoporosis is low PBM and/or high bone loss (6). Many diseases and drugs can decrease PBM or increase bone loss. The heritability of PBM is up to 40 percent under influence of genetic determinants. The black people have higher PBM than white and white people have higher PBM than Asians (7). There are many environmental and behavioral determinants for PBM in normal population. Weight bearing activities and exercises increase PBM and already BMD. Nutritious containing calcium, vitamin D, protein and other minerals and vitamins are necessary for optimal PBM. Sun exposing has positive effect on PBM whereas cigarette smoking, excess alcoholic beverage and

coffee drinking have negative effect on PBM (8). Those above items that have positive effect on PBM, decrease bone loss and others that have negative effect on PBM, increase bone loss too.

2. Main Body

Nowadays, inactivity poses a great threat to PBM gains. TV viewing and cellphone/computer using continue to increase, and the time spent in physical activities is declining. These habits seem to be more frequent among teens than third decade and it is more than after that. Nowadays, bad habit in food intake seems to be more frequent among teens and third decade. Excess coffee and fast food intake that have adverse effect on PBM are routine (9). Nowadays excess tobacco is using during adolescence and excess alcohol intake too. We know that Osteoporosis is a silent disease and upon a fun hypothesis is a pediatric disorder that manifests in old age. It is symptomatic after bone micro-fracture and its diagnosis will be missed until a pathologic bone macro fracture occurs.

3. Conclusion

Upon these facts, corresponding author (ISA) thinks that in the future about two to three decades later, a significant percent of the population of world will be Osteoporotic. We confirmed that more than 60 percent of Iranian men and more than 50 percent of Iranian women with ages less than 50 years, have low BMD (10).

By this letter, I announce that the Tsunami of Osteoporosis will be coming before 2050. We suggest a guideline for prevention of this Tsunami.

In the first decade of life; we recommend proper weight-bearing activities/exercise adjust to age/gender as soon as possible along with food regimen containing enough amounts of protein, calcium, vitamin D and other necessary vitamins and minerals. In the near future genetic tests [vitamin D Receptor (VDR) genotyping] can be done.

In the second decade of life; we have to correct life style of teens, and their bad habits must be deleted along with proper exercise and food.

In the third decade of life; especially at the ages of 20-25 years, a baseline BMD test by DXA method in all three sites must be done that is "*Tehran Recommendation*" (11).

With Z-scores of $\geq +1$ correction of life style/habits is enough and next BMD test will be done at the age of 50 year-old.

With Z-score of $< +1$ and > -1 correction of life style/habits along with calcium/vitamin D supplementation is a good strategy and next BMD test will be done at the age of 30 year-old.

With Z-score of ≤ -1 and > -2.5 , all of above items must be done, but BMD test must be repeated every two to five years for monitoring of our strategy. If there is not enough response it may have a genetic background or a secondary cause.

With Z-score of ≤ -2.5 , we recommend drug therapy along with all above items and BMD test will be repeated every

one to two years.

This guideline mentioned above is *Amir Alam Hospital guideline*" for prevention of the tsunami of Osteoporosis including "*Tehran Recommendation*" (11). It allows timely correction of life style/habits and possible supplementations to increase PBM and/or decrease bone loss and then we hope decreasing incidence of Osteopenia/Osteoporosis in the future. You may think that "*Tehran Recommendation*" will not be a practical recommendation, because it really needs a lot of BMD/DXA machine in the entire world, for BMD testing to be done. If this recommendation is done timely during three phases, it will be practical.

In phase I; BMD screening is recommended for every young healthy individual aged 20-25 years that is visited in health/medical office for checking up.

In phase II; BMD screening is recommended for young healthy individual aged 20-25 years with at least 1 risk factor for osteoporosis within general population.

Finally in phase III; it is recommended for all young healthy individual aged 20-25 years in general population.

At the end by this letter, corresponding author announces to ACR, EULAR, APLAR members and all the Rheumatologists in the world that by application of current BMD screening recommendations for postmenopausal women and men older than 70 years, we have to wait to see the Tsunami of Osteoporosis in the world in the future.

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