Osteoporosis meaning porous bones characterized by low bone mass and structural deterioration of bone tissue. It is a common ailment seen in postmenopausal women, resulting in fragile and weak bones highly susceptible to fractures of hips, spine, and wrist. One in three women over age of 50 years will develop the disease during their lifetime. Loss of 20% bone mass in 5 to 7 years following menopause is seen. Osteoporosis can be fatal and more women die of hip fractures than from cancer of ovaries, cervix, and uterus combined. It is a silent disease, because bone loss occurs without symptoms.

**GENETIC INFLUENCE:**

Like other complex diseases postmenopausal osteoporosis have strong genetic influence. DNA analysis is a powerful tool in diagnostics of those women who are at risk of disease, in identifying potential drug targets, and in predicting response to treatment. The genome searches are making efforts to identify the responsible gene variant and should identify the chromosome containing disease gene, which is a challenge in determining genetic role. Probably hundreds of genes each play a role in bone metabolism, only few of these show genetic contribution to osteoporosis.

**BMD: (BONE MINERAL DENSITY)**

It detects osteoporosis before fracture occurs, predicts fracture chances in future, detects rate of bone loss, and monitors effect of treatment. The bone density value at any point in time is a combined function of one’s peak bone mass and the amount of bone loss since skeletal maturation. A low bone density value in a very elderly woman is likely due to progressive bone loss over many years since menopause. In this process bone mass is reduced, and bone quality or architecture also deteriorates, adding further to skeletal fragility. Low bone mass in a young healthy menopausal woman may be due, in large part to entering menopause with low peak bone mass. The hip BMD is best predictor of hip fractures. Endocrinologist’s recommend first measurement at hip.

**QUALITY OF LIFE:**

This was the theme of the world osteoporosis day 2003. Fragility fractures severely affect the quality of life in postmenopausal woman, especially the spine, vertebral, and hip fractures which cause long term disability, associated with high mortality rate among elderly postmenopausal females. The emphasis was laid in preventing the osteoporotic fractures to maintain independent and active life in old age.

A multinational study was done in UK, Italy, Spain and Germany where it was found that in 95% of the cases, orthopedic surgeons failed to investigate osteoporosis as a cause of fracture. This led to the definition of osteoporotic fractures and guidelines for their treatment. Now it is clear that in elderly postmenopausal cases the fractures of hip, spine, wrist, pelvis, ankle, knee, shoulder, and clavicle should be considered and treated as osteoporotic fractures. Studies show that 50% of females will experience an osteoporotic fracture in their life time, with risk of subsequent fracture as high as five fold. Postmenopausal osteoporotic fractures will increase morbidity and mortality, especially the hip fractures will result in long term disability and even death.

**OSTEOPOROTIC FRACTURE RISK OF FEMALES AT 50 YEARS OF AGE:**

One-in-three woman over 50 years of age will experience osteoporotic fractures. 1.5 million fractures occurs each year as a result of osteoporosis.

- Hip fractures, woman one-in-six (17.5%)
- Risk fractures, woman one-in-six (16%)
- Vertebral fractures, woman one-in-six (16%)

Risk factors of osteoporosis which are changeable:
1. LOW CALCIUM OR VITAMIN D IN DIET:
   If one has low calcium diet over the years, especially during growth years, risk of developing osteoporosis is very high. Its because calcium deficiency leads to decrease in bone formation. Vitamin D is also essential to help the body absorb calcium and maintain bone.

2. LACK OF REGULAR EXERCISE:
   Exercise helps to delay osteoporosis. Lack of daily exercise makes one vulnerable to osteoporosis, because walking and exercise stimulates bone cells to activity and produce stronger bone. Without activity bones become less dense and weak.

3. CIGARETTE SMOKING:
   Smoking doubles the risk factor of osteoporosis as it lowers the estrogen level in blood.

4. UNDERWEIGHT WOMAN:
   Woman who are underweight for their height, because of less production of estrogens are also more prone for developing osteoporosis as compared to overweight females who have less chances for the same.

5. USE OF CERTAIN MEDICATIONS:
   Drugs like cortisone used for long term in high doses in case of asthma, lung disease, arthritis and allergies can also cause increase risk of developing osteoporosis. Thyroid medications in high doses can contribute to osteoporosis.

6. CHRONIC ALCOHOLICS:
   This in absence of liver disease induces osteopenia with low turn-over and increased osteoclast number, resulting in bone loss and calcium infusion from bone into plasma.

NON-CHANGEABLE RISK FACTORS FOR OSTEOPOROSIS:
   - Menopause.
   - Elderly females (an 80 year old woman is at much higher risk than younger woman with same BMD).
   - Genetic influence (family member with osteoporosis).
   - Hysterectomy with ovary removal.
   - Race (Asian, next following are African's and American's).
   - Medical problems (certain medical problems can increase risk of developing osteoporosis e.g., rheumatoid arthritis, emphysema, chronic bronchitis, hyperthyroidism, chronic liver disease, intestinal disease).

OSTEOPOROTIC SPINAL AND VERTEBRAL FRACTURES:
   These in postmenopausal woman pose a definite problem. It occurs when a compression force is applied to the spine e.g., putting a load on out stretched arms, picking up a heavy grocery bag, lifting a child, other causes are horse riding, or riding in a bouncing boat.
   Such fractures can be confirmed by anterioposterior and lateral X-ray of involved area of spine and pelvis bone scan can show a new or previously healed break. Vertebral compression causes loss of height by several inches, spinal kyphosis, protuberant abdomen, restrictive pulmonary disease, stooped posture. Even one compression fracture weakens the spine.

   In elderly postmenopausal osteoporotic vertebral fractures, the orthopedic surgeon can best guide and treat such patients. Nonsteroidal analgesic is given to relieve pain. If narcotics are added, careful dosing and observation is must. Positioning of patient is important, sometimes temporary light weight braces are used to stabilize the spine, which prevents movement so causes pain relief. Symptomatic relief of pain can be given by ice massage used as local anaesthetic during acute pain and moist heat applied every few hours to relieve muscle spasm. Bed rest no longer than one week to avoid further bone loss from immobility. Spinal vertebral fractures heal within 4 to 6 weeks, as capacity to heal remains normal in osteoporosis. Treatment of under lying osteoporosis is an important part of management of vertebral compression fractures.

PREVENTION:
   Improving calcium nutrition, vitamin D intake, regular exercise program, hormonal replacement therapy is very essential and should be started in time, calcitonin to prevent further fractures, no smoking and moderate alcohol intake.

   In study of postmenopausal woman calcium intake of 1 gram per day appears to be necessary to effect a positive impact of exercise on bone mineral density in spine. Study show that intermittent cyclical treatment with etidronate disodium (HEBP) and calcium plus alphacalcidol may be effective for increasing BMD and preventing fractures in postmenopausal osteoporosis.

TREATMENT:
   Treating of postmenopausal osteoporosis should be made in conjunction with patients age, BMD results, history of previous fractures, high risk factor for bone loss.

   In conservative management high doses of calcium intake with exercise program would be continued without any osteoporotic drug and to repeat a BMD test after 2 years. If evidence of bone loss is seen on repeat test, antiresorptive medication should be considered. Some patients with keen personal health beliefs, who are very much concerned about skeletal status, and wanting to stay active and fracture free, take and prefer medical therapy at initial stage only. It keeps them anxiety free and allows participation in all activities. Either plan is appropriate depending on quality of life related issues, objectives and concerns.

   It is easier to prevent osteoporosis than to treat it. Best is to retard menopause associated bone loss.

   - Estrogens: decrease bone loss by decreasing bone absorption. HRT thought to work best during first 5 to 10 years of menopause, requires commitment to long term use because when therapy stops significant bone loss resumes.
Despite its advantages, 75% discontinuation rate is seen after 6 months. Recommended dosage is 0.625 milligram premarin (conjugate estrogen) shown to preserve bone. Stopping of drug is because of concern about venous thromboembolism, with slight increase risk of breast cancer.

- Bisphosphonates: Non hormonal drug used to inhibit osteoclast activity so decreasing bone resorption, with no adverse effect on breast and uterus and no venous thromboembolism. Two oral bisphosphonates have been approved to prevent postmenopausal osteoporosis.
  1. Alendronate (Fosamax)
  2. Risedronate.

These drugs have shown to increase vertebral and hip BMD, and decrease vertebral fracture risk. Daily dose of 5 mg per day or once weekly is as effective as daily dosage formulation.

- SERMS (selective estrogen receptor modulator)

  These estrogen like compounds have antiresorptive properties. Raloxifene increase BMD in spine, hip and wrist although to a lesser extent than HRT/ERT or Bisphosphonates. Like estrogens Raloxifene has potentially harmful effects like VTE, but unlike estrogens raloxifene does not jeopardize endometrial/breast tissue. It does not ease menopause symptoms, but may exacerbate hot flushes.

CONCLUSION:

ERT considered good choice for women who need therapy for other postmenopausal symptoms. Raloxifene considered for women who do not have troublesome vasomotor symptoms and want a medication that improves BMD without risk to breast and uterus. Bisphosphonates are excellent for women who need to prevent bone loss only.

Barring about drug selection, clinicians should recommend adequate intake of calcium (1200 to 1500 mg per day) and vitamin D (400 to 600 IU per day) and resistant type exercises to augment the drug benefit. Interventions to Stave off bone loss can help to improve postmenopausal women quality of life and avoid serious consequences of fracture. Clinicians should take lead in prevention strategies that can increase BMD and decrease fracture risk. "Medical experts agree that osteoporosis is highly preventable".

BIBLIOGRAPHY