“Prevention is better than Cure” - Care in Perimenopause, a Leap Towards Aging Gracefully
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Osteoporosis is a major global public health problem threatening more than 200 million people worldwide.
Osteoporosis is a skeletal disorder characterized by low bone mass and microarchitectural deterioration of bone tissue leading to enhanced bone fragility and a consequent increase in the risk of fractures, even with little or no trauma.

The risk of fracture from osteoporosis in women depends on the bone mass at the time of menopause and the rate of bone loss following menopause.

The bone mass, depends on the balance of the osteoblastic (bone formation) and osteoclastic activities (bone resorption), influenced by a multitude of stimulating and inhibiting agents.
OSTEOPOROSIS

- Ageing & loss of estrogen, both, lead to excessive osteoclastic activity. Estrogen reduces the amount of active remodeling units at cellular level in bone by inhibiting osteoclasts differentiation.
- Moreover, a deficiency in estrogen increases responsiveness of bone to parathyroid (PTH) hormone and more calcium is removed from the bone, raising serum calcium, which in turn lowers PTH and decreases Vitamin D and intestinal absorption of calcium.
OSTEOPOROSIS: RISK FACTORS

1. Ageing: fracture risk doubles every 7-8 yrs after the age of 50
2. Previous history of Fragility fractures
3. History of Fragility fractures in close relatives
4. Smoking
5. Thin & small framed
6. Family history of Osteoporosis
7. Amenorrhea (Hypoestrogenism)
8. Life long deficient calcium and Vitamin D intake
9. Use of bone losing medications- corticosteroids
10. Sedentary lifestyle
11. Excessive use of alcohol
12. Rheumatoid arthritis
AIM

- To evaluate the status of bone health in perimenopausal women & its impact on their postmenopausal bone health and thereby advocate prevention and management methods
OBJECTIVES:

- To identify and evaluate serological factors for bone health and identify their prognostic value in postmenopausal bone health status.

- To identify patterns of correlation between serum FSH and Calcium levels and bone mineral density in perimenopausal women.

- To suggest treatment methods for perimenopausal osteopenia so as to prevent postmenopausal osteoporosis.
Materials and methods

- We conducted a BMD study in 41 women of age group 45 to 50 yrs.

- Family history of osteoporosis, medical and obstetric history, calcium intake, amount of physical activity and consumption of tobacco and alcohol were assessed.

- Serum levels of follicle stimulating hormone (FSH) and calcium (Ca) were measured along with assessment of bone mineral density (BMD) using Dual-energy X-ray absorptiometry (DEXA).
BONE MINERAL DENSITY (BMD)

- BMD is the amount of Bone mineral in the Bone tissue
- The World Health Organization (WHO) Scientific group defined Osteoporosis based on BMD. A standardised score, called T-score, is used to compare, BMD to average values for young healthy women, is used to define the categories.
- The categories for diagnosis are as below:
  - Normal (T-score -1.0 & above)
  - Low bone-mass referred to as Osteopenia (T-score between -1.0 & -2.5)
  - Osteoporosis (T-score -2.5 & below)
  - Severe Osteoporosis (T-score -2.5 & below with a history of fracture)
The study included 41 women, aged between 35 and 70 years; 61% of women were below 48 years of age. All 41 women were married and having 2 to 3 children. All women were physically active and did not consume tobacco or alcohol in any form.

<table>
<thead>
<tr>
<th>Age (years) Category</th>
<th>Number</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>≤ 48</td>
<td>25</td>
<td>61.0</td>
</tr>
<tr>
<td>&gt; 48</td>
<td>15</td>
<td>36.6</td>
</tr>
<tr>
<td>Missing</td>
<td>1</td>
<td>2.4</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Unit</th>
<th>Age</th>
<th>T score</th>
<th>Z score</th>
<th>FSH</th>
<th>Calcium</th>
<th>Height</th>
<th>Weight</th>
<th>BMI</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mean</td>
<td>48.3</td>
<td>-0.4</td>
<td>0.4</td>
<td>38.2</td>
<td>9.1</td>
<td>5.3</td>
<td>58.8</td>
<td>22.8</td>
</tr>
<tr>
<td>Standard Deviation</td>
<td>11.6</td>
<td>1.0</td>
<td>1.0</td>
<td>31.7</td>
<td>1.0</td>
<td>0.2</td>
<td>9.5</td>
<td>3.4</td>
</tr>
<tr>
<td>Median</td>
<td>45.0</td>
<td>-0.4</td>
<td>0.2</td>
<td>15.6</td>
<td>9.1</td>
<td>5.2</td>
<td>56.0</td>
<td>22.3</td>
</tr>
<tr>
<td>Minimum</td>
<td>35.0</td>
<td>-2.2</td>
<td>-1.1</td>
<td>1.5</td>
<td>4.5</td>
<td>4.8</td>
<td>42.0</td>
<td>15.5</td>
</tr>
<tr>
<td>Maximum</td>
<td>70.0</td>
<td>2.0</td>
<td>3.4</td>
<td>102.6</td>
<td>10.5</td>
<td>5.9</td>
<td>80.0</td>
<td>30.7</td>
</tr>
</tbody>
</table>
Results

- BMD - as assessed by T-scores - showed low bone mass (osteopenia) in 32% of women and normal bone mass in the remaining (68%).
- A total of 32% of women had T-score between -1 to -2.4, indicating that were going towards osteoporosis.
- Calcium was low in 29% of women.
- Serum FSH was high in 51% of women, borderline in 9.8% and normal in the remaining.
<table>
<thead>
<tr>
<th>Test</th>
<th>Women</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>T-score (World Health Organization definition)</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>&gt; -1</td>
<td>Normal</td>
<td>28</td>
<td>68.3</td>
</tr>
<tr>
<td>-1 to ≤ -2.5</td>
<td>Low bone mass (Osteopenia)</td>
<td>13</td>
<td>31.7</td>
</tr>
<tr>
<td>&lt; -2.5</td>
<td>Osteoporosis</td>
<td>0</td>
<td>0.0</td>
</tr>
<tr>
<td><strong>Z-score</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>≤ - 2.0</td>
<td>Below the expected range for age</td>
<td>0</td>
<td>0.0</td>
</tr>
<tr>
<td>&gt; -2.0</td>
<td>Within the expected range for age</td>
<td>41</td>
<td>100.0</td>
</tr>
<tr>
<td><strong>Serum Calcium (mg/dL)</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>&lt; 8.9</td>
<td>Low</td>
<td>12</td>
<td>29.3</td>
</tr>
<tr>
<td>8.9-10.1</td>
<td>Normal</td>
<td>29</td>
<td>70.7</td>
</tr>
<tr>
<td>&gt; 10.1</td>
<td>High</td>
<td>0</td>
<td>0.0</td>
</tr>
<tr>
<td><strong>Serum FSH (mIU/mL)</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>&lt; 10</td>
<td>Normal</td>
<td>16</td>
<td>39.0</td>
</tr>
<tr>
<td>10 to 30</td>
<td>Borderline</td>
<td>4</td>
<td>9.8</td>
</tr>
<tr>
<td>&gt; 30</td>
<td>High</td>
<td>21</td>
<td>51.2</td>
</tr>
</tbody>
</table>
Figure 1: Age versus t-score, z-score, serum FSH and calcium

FSH levels were > 40 mIU/mL in women ≥ 55 years.
T-scores were negative in the majority of women ≥ 50 years of age.
Serum calcium levels were < 9 mg/dL and T-scores were negative in the majority of women ≥ 50 years of age.

Figure 3: Age versus T-score and Calcium
Women with T-scores < -1 had a BMI ranging from 18 to 30 kg/m2.
Figure 4: Age versus FSH and Calcium
Conclusion

- The prevalence of osteopenia and declining BMD readings were found to be high in perimenopausal women which is a major health concern.

- Raised FSH and low calcium in perimenopausal women should be considered definite markers of osteoporosis risk, which can be easily treated to prevent fracture risks.

- So goes the saying "Prevention is better than Cure"
Vitamin D and Menopause

- A calcium and vitamin D trial assessed the relationship between the blood levels of vitamin D and a number of menopause symptoms, including hot flashes, night sweats, sleep disturbance, concentration, and forgetfulness.

- Some studies have implied such a relationship.
  - Breast cancer patients with higher Vit D levels have fewer hot flashes and other symptoms than women with lower levels.
  - Supplementing Vit D can improve mood.
  - Vit D can protect against the depletion of serotonin, which plays a role in regulating body heat.
  - Vit D deficiency can result in muscle and joint pain.

- Furthermore, estrogen plays a role in activating vitamin D, meaning that the estrogen deficiency could worsen any problems with vitamin D deficiency.
Citations

1 https://www.sciencedaily.com/releases/2014/04/140416090801.htm
Thank you!