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Osteoporosis and its treatment using phytoestrogens of cowpeas

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Abstract

Osteoporosis is a worldwide threat. It occurs mostly in women than in men due to menopausal loss of estrogen. Hence there will be reduced levels of estrogen in the body. This leads to reduced bone formation and increased bone reabsorption. Various synthetic drugs like bisphosphonates, SERM's, teriparatide and hormonal replacement therapy (HRT) are given for the treatment of osteoporosis. However prolonged use of these drugs has not shown significant effects. This study is based on postmenopausal stage where there is loss of estrogen in women and the treatment goal is to restore the function of estrogen by using natural means. The purpose of the study is to determine efficacy of cowpeas in treatment of osteoporosis as it is known to be a source of isoflavones in addition to vitamin D. Phytoestrogens are compounds of leguminous plants mostly. Phytoestrogens enact as estrogen molecules and are structurally similar to E2. Consumption of cowpeas may show significant increase in BDM bone volume.

Keywords: Phytoestrogens, cowpeas, isoflavones, osteoporosis

Introduction

What happens in Osteoporosis?

In osteoporosis bones become weak and liable to break easily, this is caused due to imbalance in hormones or deficiency of vitamin-D and calcium.

Role of osteoclasts and osteoblasts

Osteoclast

These are the cells that absorb the bone tissue during growth and healing so this is also called as bone eaters' cells.

Osteoblasts

These are the bone forming cells which secrete the substance of bone.

Role of estrogen in osteoporosis

There is a significant role of estrogen in balancing the bone health in body as it helps in prevention of bone loss, absorption and calcium reabsorption.

Primary osteoporosis or post-menopausal osteoporosis is widely seen in postmenopausal women having loss of estrogen secretion

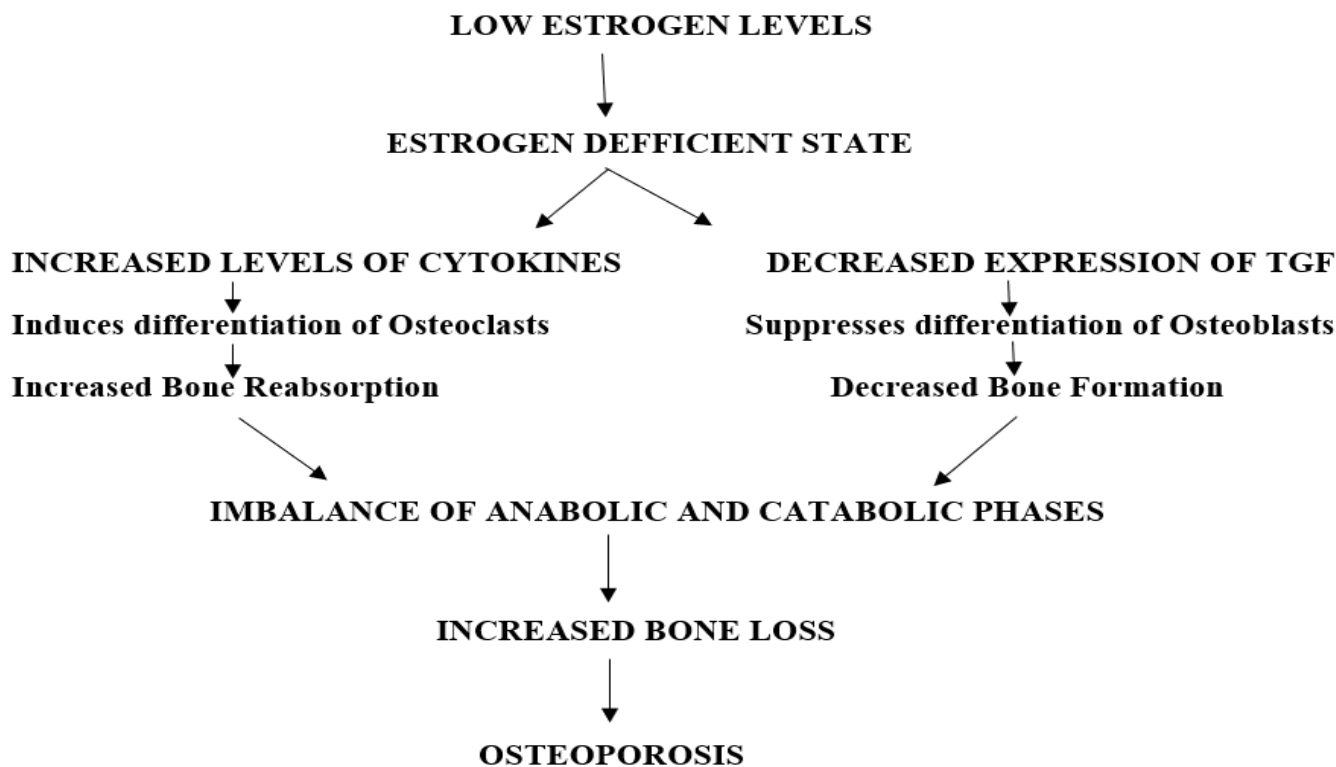
How does depletion in estrogen levels causes osteoporosis?

In postmenopausal women there is no estrogen or less estrogen levels. This leads to estrogen deficient state. In such state increased release of cytokines is seen and this induces differentiation of osteoclast which ultimately increases bone reabsorption. An Estrogen deficient state causes decreased expression of TGF which leads to the suppression of differentiation of osteoblasts which ultimately decreases bone formation. This further leads to increased bone loss as the formation of bone is decreased and reabsorption has increased. All such changes lead to osteoporosis. On conclusion we can say that osteoporosis is caused when there is imbalance between the two phases i.e., anabolic (bone forming) and catabolic (bone reabsorption).

Anabolic phase refers to the forming of bone by osteoblasts and catabolic phase refers to the bone reabsorption for which osteoclasts are responsible.

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General treatment options for osteoporosis

1. Hormonal Replacement Therapy (HRT)
2. Bisphosphonates
3. Selective Estrogen receptor modulator's (SERM) etc.

However as being synthetic use of these drugs is very limited as it can lead to complications like breast cancer and cardiovascular diseases. Alternate compounds obtained from plant source serve as a better approach for a safer therapy.

Use of phytoestrogens in treatment of osteoporosis

Phytoestrogens and significance: The most widely used food supplements are phytoestrogens belonging to class of isoflavones which are known to have predictable effects on reproductive performance and balancing of hormone levels. Phytoestrogens are corresponding analogs of heterogeneous group of herbal substances. Phytoestrogens are diphenolic, non-steroidal estrogens known to have its structure similar to that of estrogen E₂.

• Phytoestrogens are of three classes

1. Isoflavones
2. Lignans
3. Coumestans

• Isoflavones are of two types

1. Daidzein
2. Genestein

Phenolic ring structure is responsible for unalterable bond with Estrogen Receptors (ERs) enact actions of estrogens. These phytoestrogens bind to the Estrogen receptors and shows its function but it might not show significant increase in estrogen levels.

Extraction of phytoestrogens: Cowpeas are ground in a mill. The flour obtained have to be taken and is extracted using organic solvents like 70% ethanol or isopropyl alcohol.

These organic solvents are used based on previous studies which showed more solubility of isoflavones in these solvents. The glucoside part of these phytoestrogens is converted into aglycone forms using HCl. This increases the concentration of aglycone form of isoflavones. Water is added to the hydrolyzed product. The isoflavones are crystallized after addition of the water as it acts as an antisolvent for the isoflavones which help in their crystallization from alcoholic solution. Thin Layer Chromatography (TLC) and High-Performance Liquid Chromatography (HPLC) are to be carried out for the identification and quantification of isoflavones.

Discussion on expected outcomes: After phytoestrogen binds to ER β receptors and exhibits its action which reflects the action of estrogen thereby enhancing the bone formation shields the reabsorption. Consequently, establishes balance between the bone catabolic and anabolic phases. Besides these effects, phytoestrogens also exhibit effect on Vitamin-D levels in body. Phytoestrogens enhances role of Vitamin-D in absorption of calcium from intestine and makes sure bones are strong and dense and regulates serum calcium concentrations. Actions of Vitamin-D has shown a significant increase in cell number BMD. To conclude phytoestrogen emerges out to be safer alternative choice used in treatment of osteoporosis with no or minimal side-effects.

References

1. Rishika J, Vijayalakshmi V, Rajanna A, Naresh V, Suresh C.
2. Jyoti et.al
3. Cassidy *et al.* 1994; Wu *et al.* 2000;
4. Romualdi *et al.* 2008.
5. Annalisa Romani, Pamela Vignolini, Carlotta Galardi, Claudio Aroldi, Concetta Vazzana, Daniela Heimler. Polyphenolic Content in Different Plant Parts of Soy Cultivars Grown under Natural Conditions. Journal of Agricultural and Food Chemistry, 2003.

6. M Penza, C Montani, A Romani, P Vignolini, P Ciana, A Maggi, B Pampaloni, L Caimi, DDi Lorenzo.