ABSTRACT

Background: Menopause is a permanent cessation of menses resulting from reduced ovarian hormones secretion that occurs naturally or induced by surgery, chemotherapy or radiation. The aim of this study is to estimate serum alkaline phosphatase and calcium in pre and post-menopausal women, compare the two levels and evaluate the need of calcium supplementation in study population. Methodology: the present study was carried out on 80 total subjects divided into two groups 40 women were pre menopause and the rest were post menopause. Alkaline phosphatase was measured by kinetic method and calcium was measured by ortho cresolphathlein complex method. Results: the result of calcium and alkaline phosphatase showed statistically significant difference between pre and post-menopausal women with p.value (0.000 and 0.000) respectively. Conclusion: The Increasing in bone turnover activate reduction in bone mass. Our study suggest that post-menopausal women have to take calcium rich foods to maintain normal level of calcium and if foods are not available or serum still low supplementation by tablets alternative.

KEYWORDS: post-menopausal women, calcium and Alkaline phosphatase.

INTRODUCTION

The word “menopause” is defined from Greek words meno which means month and “pause” which means (to stop) menopause said to have occurred when menstruation has stopped for twelve consecutive months.[1] menopause also defined as the permanent cessation of menses resulting from reduced ovarian hormone secretion that occurs naturally or induced by surgery, chemotherapy or radiation.[5] post menopause is estrogens deficient state. It applies to whole of women’s life after meno paus[1] Estrogens play important role in the growth and maturation of bones as well as regulation of bone turnover in adult bone. Its deficiency leads to increase osteoclast formation and enhance bone resorption. Osteoporosis is silent disease involve gradual loss of bone mass. It is a degenerative bone disorder where there is thinning and weakening of the bone mass and density so the susceptibility to fracture is increase. Fractures related to osteoporosis are estimated to affect a round 30% of women and 12% of men in developed countries. [3]

Osteoporosis is a disease that weakens bone, increasing the risk of sudden and unexpected fractures.[4]

Serum alkaline phosphatase is the most commonly biochemical marker used to evaluate bone turnover.

Alkaline phosphatase is a ubiquitous enzyme that plays an important role in osteoid formation and mineralization. The total ALP serum pool consist of several dimeric isoform which originate from various tissues such as liver, bone, intestine, spleen, kidney and placenta.[5]

Calcium has definite role in bone metabolism is particularly important in elderly women because low dietary intake have been associated with reduced bone mineral density.[6,7]

Dr Lavanya Y, Dr strikanth S, India 2015. Found that calcium significantly decrease n post menopausal women (p value <0.01).

Deepa S.Sajjanar 1 and Sanjeev L. Sajjanar 2, India 2014 found that alkaline phosphatase significally increase in post menopausal (p value 0.001), and calcium significantly decrease (p value 0.001).

Josh KR, Devi SP and Lanjikar PP 2013, Nepal, found that calcium decrease in post menopausal women (p value 0.000), and alkaline phosphatase slightly increase (p value 0.046).

Ashuma S, Shashi S, Sachdeva S 2005. Nigeria, found that calcium increase in post menopausal women (p value < 0.05).

**Aim of the study**
To evaluate the risk of bone turnover using Alkaline phosphatase and calcium as bone markers in postmenopausal women.

To evaluate the need of calcium supplementation in study population.

**MATERIALS AND METHODS**
The study was conducted at Getina teaching hospital – Sudan, during November 2016 to March 2017. 80 women were enrolled in the present study.

Verbal inform consent was taken from all participants. The study population were divided into two groups; forty women (50%) were post menopause age rang (50-70 years) and the rest of studied group were pre menopause under 40 years.

Smokers, alcoholics, pregnant women, women on hormonal replacement therapy, oral contraceptive pills, calcium supplementation, or other medications known to affect bone metabolism were excluded.

Five milliliter of blood sample was collected aseptically; serum were separated immediately after blood had clotted by centrifuging at 3000 rpm for 10 minutes and kept at 4°C until analysis was performed. Serum Alkaline phosphatase was measured by kinetic method using biosystem kits for ALP with sensitivity 1.0U/L and CV of 3.4%.

Calcium was measured by orthocresolphthalein complex (CPC) method with sensitivity of 1mg/dl and CV of 0.8%

**RESULT**
The serum ALP and calcium were analyzed in post and pre-menopausal women and showed the following results:

<table>
<thead>
<tr>
<th>Variable</th>
<th>Post menopause</th>
<th>Pre menopause</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ca++ (mg/dl)</td>
<td>Mean</td>
<td>SD</td>
</tr>
<tr>
<td>7.5</td>
<td>1.3</td>
<td>4.5</td>
</tr>
<tr>
<td>ALP (IU/L)</td>
<td>86.4</td>
<td>34.7</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Variable</th>
<th>Post menopause</th>
<th>Pre menopause</th>
<th>p.value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ca++ (mg/dl)</td>
<td>7.5</td>
<td>8.9</td>
<td>0.000</td>
</tr>
<tr>
<td>Alp (U/L)</td>
<td>86.4</td>
<td>61</td>
<td>0.000</td>
</tr>
</tbody>
</table>
Table 1 and 2 revealed that calcium were significantly reduced in post-menopausal group mean 7.5± 1.3 when compared to pre-menopausal group of mean 8.9±1.2, while ALP was significantly increased in post-menopause women when compared to the other group.

There was statistically significant difference in calcium and ALP levels between two groups (P = 0.000, 0.000, respectively).

DISCUSSION
Post menopause is estrogen deficiency state. Estrogen has important role in the growth and maturation of bone and its deficiency lead to increase bone resorption.

The result of present study showed there is statistical significant difference between post an pre-menopausal regarding serum calcium and serum ALP. our findings agreed with; Dr Lavanya Y, Dr strikanth S , India 2015, Deepa S.Sajjanar 1 and Sanjeev L. Sajjanar 2, India 2014 and Josh KR, Devi SP and Lanjikar PP 2013, Nepal [7,8,9]

Masse P, Jaugleux JL, Caissie M etal, Canada 2005 and Ashuma S, Shashi S, Sachdeva S 2005,1011 disagreed with our findings of calcium. And this disagreement may be due to; methodology, sample size, diet and nutritional status.

ACKNOWLEDGMENT
Thanks and tribute …to my parents, my husband and my kids for supporting me.

All gratitude and appreciation to clinical chemistry department at Faculty of Medical Laboratory Sciences-University of Khartoum and to Dr. Tariq for his patience and support in overcoming numerous obstacles I had faced on my study.

CONCLUSION
The Increasing in bone turnover activate reduction in bone mass while decreasing in bone turnover is associated with preservation of bone mass and integrity.

Our study suggested that post-menopausal women have to take calcium rich foods to maintain normal level of calcium and if foods are not available or serum still low supplementation by tablets may be an alternative.

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