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Serum phosphorus levels in natural menopausal women and surgical menopausal women: A comparative study

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Abstract

Aim: Comparison of serum phosphorus levels in natural menopausal women with surgical menopausal women.

Methods: The present analytical cross sectional study was conducted on patients (out patients and in patients) in Department of Obstetrics and Gynecology, Kamla Nehru Hospital, attached to IGMC Shimla. Group 1 (N=60): Women who had undergone hysterectomy with bilateral salpingo oophorectomy at least 6 month ago. Group 2 (N=60): Women who have attained natural menopause at least 1 year ago. Serum phosphorus was estimated by Molybdate U.V. method in mg/dl after the relevant quality control checks.

Results: In the present study maximum number of the patients 26 (43.3%) were in the age group of 46-50 years for the post-surgical menopausal group and in the natural menopausal group maximum number of the patients were in the age group of 51-55 years 23 (38.3%). Maximum numbers of patients are multiparous in both groups. Total number of women having hypophosphatemia were 12 in which 3 (5.0%) were natural menopausal and 9 (15%) were postsurgical menopausal. Total number of women having hyperphosphatemia were 4 in which all were postsurgical menopausal.

Conclusions: The prevalence of osteoporosis is very high in this part of India. Both natural and post-surgical menopausal women have lower levels of serum phosphorus.

Keywords: postmenopausal women, osteoporosis, serum calcium

Introduction

The word menopause is derived from the Greek words “meno” means month and “pause” to stop. [1] Menopause is defined as permanent cessation of menses resulting from reduced ovarian hormone secretion that occurs naturally or is induced by surgery. [2]

At menopause the ovarian follicles lose their function and thus results in decreased production of estradiol and other hormones. Decreased estrogen also affects the serum and urinary level of phosphorus indirectly at various levels. Decreased estrogen also alters the intestinal absorption, bone resorption and renal reabsorption of phosphorus. [3]

Reduced ovarian hormone secretion is mainly suggested by early development of osteoporosis in women who attained premature menopause either due to natural or surgical causes. [4] All the changes take gradual course of time after natural onset of menopause.

However after surgical menopause the blood supply to the ovaries are affected, thus the women who have surgical menopause at early age have changes in their endocrinological status early and attain menopause 3.7 years earlier than the women who attain the natural menopause. The onset of endocrinological changes after surgical menopause is very sudden unlike natural menopause.

Very few studies have been conducted to see the effect of sudden decrease and early onset of decreased oestrogen levels (endocrinological changes) associated with surgical menopause on serum levels of phosphorus in north Indian women. Hence the present study is aimed at comparing and treating the levels of serum phosphorus among surgical and natural menopausal women of north Indian women.

Materials and methods

The present analytical cross sectional study was conducted on patients (out patients and in patients) in Department of Obstetrics and Gynecology, Kamla Nehru Hospital, attached to

Ethical approval and Informed consent

The study protocol was reviewed by the Ethical Committee of the Hospital and granted ethical clearance. After explaining the purpose and details of the study, a written informed consent was obtained.

Inclusion criteria

- Women who had undergone hysterectomy with bilateral salpingo oophorectomy at least 6 month ago.
- Women who have attained natural menopause at least 1 year ago
- Women who had signed the informed consent

Exclusion Criteria

- Women on HRT therapy
- Women with other endocrine and metabolic disease
- Women suffering from bone disorder which affect phosphorus levels
- Chronic use of drugs such as steroid therapy

Grouping

Group 1: Women who have attained natural menopause at least 1 year ago

Group 2: Women who had undergone hysterectomy with bilateral salpingo oophorectomy at least 6 month ago

Methodology

Blood samples of all patients of study groups were collected in a plain vacutainer tubes under all aseptic precautions. Serum was separated after twenty minutes of collection by centrifuging the sample. After that serum was stored in a vial at 4 degree celsius. All the estimations were done within two days of storage by fully automated chemistry auto analyzer. Serum phosphorus was estimated by Molybdate U.V. method in mg/dl after the relevant quality control checks.

Statistical Analysis: The recorded data was compiled and entered in a spreadsheet computer program (Microsoft Excel 2010) and then exported to data editor page of SPSS version 20 (SPSS Inc., Chicago, Illinois, USA).

Descriptive statistics included computation of percentages, means and standard deviations were calculated. The statistical tests applied for the analysis was chi-square test. For both the tests, confidence interval and p-value were set at 95% and ≤ 0.05 respectively.

Results

Table 1: Shows distribution of women according to age in comparison groups

Age	Natural menopausal women	Post surgical Menopausal women
40- 45 years	0	25 (41.66%)
46- 50 years	19 (31.7%)	26 (43.3%)
51 – 55 years	23 (38.3%)	9 (15%)
56-60 years	13 (21.7%)	0
61-65 years	3 (5%)	0
>65 years	2 (3.3%)	0
Total	60	60
Mean Age	53.40	46.00
Mean Age at Menopause	48.87	47.09

Test applied: chi-square test, $p \leq 0.05$ Significant

Table 2: Shows distribution of women according to parity in comparison groups

Parity	Natural menopausal women	Post surgical menopausal women
Nulliparous	1 (1.0%)	2 (3.0%)
Primipara	4 (6.0%)	6 (10%)
Multipara	28(46.7%)	34 (56.7%)
Grand multipara	27(45%)	18 (30%)
Total	60	60
p-value	0.001 (Sig.)	

Test applied: chi-square test

Table 3: Shows distribution of women according to BMI in comparison groups

BMI	Natural menopausal women	Post surgical menopausal women
< 18.5 (Underweight)	1 (1.7%)	0
18.5-24.9 (Normal)	27(45.0%)	22(36.6%)
25- 29.9 (Overweight)	28(46.6%)	28(46.6%)
>30 (Obese)	4 (6.7%)	10 (16.6%)
Total	60	60
p-value	0.002 (Sig.)	

Test applied: chi-square test

Table 4: Shows distribution of women according to phosphorus levels in comparison groups

Serum phosphorus	Natural menopausal women	Post surgical menopausal women
<2.7 mg/dl (Hypophosphatemia)	3(5.0%)	9 (15%)
2.7-4.5 mg/dl (Normal range)	57(95%)	47(78.3%)
>4.5mg/dl (Hyperphosphatemia)	0	4(6.7%)
Total	60	60

Test applied: chi-square test

Discussion

In the present study, 120 women were included having natural menopause and surgical menopausal group, attending the OPD of Obstetrics and Gynaecology department of Kamla Nehru Hospital for Mother and Child attached to Indira Gandhi Medical College Shimla. These patients were evaluated for serum phosphorus in menopausal status have been conducted in various countries but still there is limited data available in our population hence this study was undertaken. It is fact the world population is getting older, this issue brought osteoporosis to the attention as it is known to be the disease of elderly. It increases morbidity among menopausal women. We studied the post surgical menopausal women 6 months earlier as compared to the natural menopausal women for early detection of decreased levels of serum phosphorus so that we can treat them earlier and prevent osteoporosis in them. In the natural menopausal group, mean serum phosphorus level is similar to Sasmita et al study. While mean serum phosphorus observed in Yeldose S *et al.* [3] study was 5.1 ± 3.10 .

In post surgical menopausal group mean serum phosphorus level observed is almost similar to Yeldose S *et al.* [3] study while observed mean phosphorus level in Sreekantha *et al.* [5] study was higher than present study.

In our study there is no significant difference of phosphorus level in all the three groups. The reason may be the supplementation of calcium in both menopausal group which inturn increases the level of phosphorus in post menopausal women. [6]

Conclusion

The prevalence of osteoporosis is very high in this part of India. Both natural and post- surgical menopausal women have lower levels of serum calcium. Our study suggests that postmenopausal women should take calcium rich foods like milk, cheese, broccoli, greens vegetables, soybean, spinach, tofu, enriched flour, sardine etc. If serum levels are low then supplementation with one gram calcium is advised.

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