



Research Paper

## Comparison of Bone Specific Alkaline Phosphatase Levels During Proliferative And Secretory Phases of Normal Menstrual Cycle

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**ABSTRACT:** The physiology of bone is like that of physiology of any organ in the body which is addressed within the frame work of role of different hormones in growth and decay process of the body. Apart from growth hormone, thyroid hormone and insulin the usual hormones related to growth and decay of various body tissues and organs there is also said to be the role of oestrogens and progesterones in a similar process. As there is a cyclic variation of concentration of these hormones during normal menstrual cycle, the role, if it is there, has to be appreciated in terms of cyclic variations of biochemical parameters related to the growth and decay process and when it is pertaining to bone to its osteoblastic and osteoclastic activity. In the present study we attempted to correlate the Bone specific Alkaline Phosphatase levels during proliferative and secretory phases of normal menstrual cycle in reproductive age women.

**Keywords:** Bone specific Alkaline Phosphatase Menstrual cycle Proliferative phase Reproductive age Secretory phase

### I. INTRODUCTION

Normal women experience monthly episodes of increased bone resorption from menarche to menopause due to low level of oestrogen and progesterone during follicular phase of normal menstrual cycle<sup>1</sup>. There will be alterations in hormone environment with bone mineral density differences before the final menstrual period. The greater variations in reproductive hormones and menstrual bleeding patterns in mid aged women might engender environment permissive for less bone<sup>2</sup>. Levels of bone formation marker and bone resorption markers increased rapidly in women with osteopenia or osteoporosis indicating that they may be sensitive markers to determine the bone turnover rate in healthy women.

### II. MATERIALS AND METHODS

The present study was conducted in the department of Physiology, Kakatiya Medical College and department of Biochemistry in Government Maternity Hospital, Warangal in Telangana State for the selection of 30 subjects. Prior to the commencement of the study consent was obtained from the College Ethical Committee and written consent was obtained from the subjects. Each subject was informed in detail of its objective, the aim of the research protocol and the method to be used. Blood samples were collected during proliferative and secretory phases of normal menstrual cycle for routine lab investigations and Bone specific Alkaline Phosphatase levels. Subjects with history of amenorrhea, abnormal menstrual cycles, DUB, on estrogen and corticosteroid therapy were excluded.

5ml of venous blood was collected under strict aseptic precautions using sterile disposable syringes and was separated by centrifugation and processed for assessing the Bone specific Alkaline Phosphatase levels by pNPP-AMP(IFCC) method. The readings were obtained directly from a semi auto analyzer. The assay principle was at pH 10.3 alkaline phosphatase catalyses the hydrolysis of colorless p-nitrophenyl phosphate (pNPP) to yellow colored p-nitrophenol and phosphate. Change in absorbance due to yellow color formation is measured at 405 nm and is proportional to the Total Alkaline Phosphatase (TAP) activity in sample. The sample was re-estimated after incubating at 56 degrees C for 10 minutes, the difference between TAP and the remaining heat stable alkaline phosphatase gives Bone specific Alkaline Phosphatase.

### III. RESULTS

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To determine the cyclic changes of female sex hormones during the menstrual cycle are related to changes in bone formation and resorption, we measured serum Bone specific Alkaline Phosphatase (BAP) during one menstrual cycle in 30 healthy reproductive age women. The data obtained was analyzed by using regression analysis by ANOVA method during proliferative and secretory phases of normal menstrual cycle.

**Table:** Showing Bone Specific Alkaline Phosphatase During Proliferative And Secretory Phases Of Normal Menstrual Cycle

Model	Sum Of Squares	Df	Mean Square	F	Significance
Regression	332.927	1	332.927	1.393	0.246
Residual	8127.823	34	239.054		
Total	8460.750	35			

Regression analysis along with ANOVA of the data with day of menstrual cycle as the independent variable and Bone specific Alkaline Phosphatase as the dependent variable showed statistically significant values of  $F=10.393$ ,  $r=.198$ ,  $Significance=0.246$ ,  $beta\ coefficient=0.198$  and  $slope=0.062$

### IV. DISCUSSION

Longer cycles have been associated with longer follicular phase, delayed oestrogen peak and lower mean estradiol level of the entire cycle. Prolonged menstrual cycle length is associated with decreased Bone Mineral Density in a population of pre and peri menopausal women. The decrease in BMD is at whole body, total hip, femoral neck and lumbar spine in prolonged menstrual cycle. It is well established that estrogen deficiency at menopause results in increased bone turnover which is reflected in increased concentrations of markers of bone formation and bone resorption in serum and urine. There will be sequential changes of bone resorbing cytokines, bone metabolic markers and the effect of ovarian hormones on bone metabolism during the menstrual cycle. The role of oestrogen and progesterone in osteoblastic and osteoclastic activity was documented by assessing biochemical parameters and estimation of bone mineral density in relation to phases of normal menstrual cycle and age. There is decreased osteoclastic activity in the secretory phase due to sustained elevations of oestrogen and progesterone during that phase. There is decreasing osteoblastic activity with advancement of age due to declining levels of sex hormones.

### V. CONCLUSION

There were significant changes in the levels of markers of bone formation mainly rise in serum Bone specific Alkaline Phosphatase during the mid and late follicular phases of normal menstrual cycle. Levels of bone formation and bone resorption markers are considered as sensitive markers to determine bone turnover during the proliferative and secretory phases of normal menstrual cycle.

### REFERENCES

- [1]. Chiu KM, Ju J: Changes in bone resorption during the menstrual cycle. *J Bone Miner Res* 1999, Apr.14 (4):609-15
- [2]. Gorai I, Chaki O, Urinary Biochemical markers for Bone Resorption during the menstrual cycle. *Calcif Tissue Int*: 1995, Aug:57(2):100-4
- [3]. Hotchkies CE Brommage R: Changes in bone turnover during the menstrual cycle in cynomolgus monkeys: *Calcif Tissue Int*: 2000, Mar.66(3):224-8
- [4]. Nielsen HK, Brixen K, Changes in biochemical markers of osteoblastic activity during the menstrual cycle. *J Clin Endocrinol Metab* 1990: May: 70(5): 1431-75
- [5]. Ouyang F, Wang X, Menstrual cycle lengths and bone mineral density: a cross-sectional population based study in rural Chinese women ages 30-49 years. *Osteoporosis Int*:2007 Feb 18(2).221-233
- [6]. Schlemmer A, Hassager C, Possible variation in bone resorption during the normal menstrual cycle: *Acta Endocrinol: Copenh*: 1993 Nov.129(5): 388-92
- [7]. Baran DT, Whyte MP: Effect of the menstrual cycle on calcium regulating hormones in the normal young woman. *J Clin Endocrinol Metab* : 50:377-379
- [8]. Comite F, Delman M, Reduced bone mass in reproductive aged women with endometriosis. *J Clin Endocrinol Metab* 1989:69:837-842
- [9]. Pitkin RM, Reynolds WA: Calcium regulating hormones during the menstrual cycle. *J Clin Endocrinol Metab* 1978:47: 626-632
- [10]. Slemenda CW, Longcope C: Sex steroids, bone mass and bone loss. A prospective study of pre, peri and postmenopausal women. *J Clin Invest* 97: 14-21
- [11]. Turner CH: Homeostatic control of bone structure. *Bone* 1991; 12:203-217

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