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ANXIETY SCORE AND SALIVARY CORTISOL LEVELS DURING DIFFERENT PHASES OF MENSTRUAL CYCLE

NEEMA TIWARI[*1], SEEMA SINGH[2] AND SUNITA TIWARI[3]

[1]JUNIOR RESIDENT,ERAS LUCKNOW MEDICAL COLLEGE AND HOSPITAL,LUCKNOW
[2]HEAD OF THE DEPARTMENT,INTEGRAL INSTITUTE OF MEDICAL SCIENCES AND RESEARCH,LUCKNOW
[3]HEAD OF THE DEPARTMENT,KING GEORGE MEDICAL UNIVERSITY ,LUCKNOW

ABSTRACT

Stress is a non specific response of the body ,when exposed to any demanding situation. A slight increase in cortisol levels,cortisol being the major stress hormone implicated in stress, has positive effects like increased energy, increased memory and decreased pain sensitivity.However, prolonged increase in cortisol levels can disrupt blood sugar metabolism, trigger emotional problems and elicit a feeling of constant weakness and tiredness. Salivary cortisol level measurement is a valuable and convenient alternative to plasma cortisol estimation. Even though people suffering from more stress than average have higher cortisol levels, it is yet to be demonstrated in natural conditions and in different phase of life.In our study,we studied the association of salivary cortisol with stress in different phases of the menstrual cycle and we concluded that salivary cortisol levels show positive correlation with luteal phase of menstrual cycle.

Keywords: **salivary cortisol,follicular,luteal,stress**

NEEMA TIWARI
JUNIOR RESIDENT, ERAS LUCKNOW MEDICAL COLLEGE AND HOSPITAL, LUCKNOW

*Corresponding author

INTRODUCTION

Stress as defined by Hans Selye is the "non specific response of the body to any demand upon it" During stressful conditions the body responds by releasing various hormones like adrenalin and cortisol, latter being the major hormone responsible for coping with stress besides DHEA (Dehydroepiandro stenidione). It has been observed that a slight increase in cortisol level has positive effects like increased energy, increased memory and decreased pain sensitivity much cortisol over a long period of time can disrupt blood sugar metabolism, trigger emotional problems and elicit a feeling of constant weakness and tiredness. Salivary cortisol level measurement is a valuable and convenient alternative to plasma cortisol estimation. Even though people suffering from more stress than average have higher cortisol levels, its yet to be demonstrated in natural conditions and in different phase of life. Some workers found that in normal women post stress cortisol levels were significantly higher during the premenstrual period than they were during mid cycle phase. [(1)] The results of endocrinological research on basal cortisol levels throughout the cycle suggest that either there may be an increased preovulatory level or there is no cyclic variation. [(2)]Cortisol level varies across the menstrual cycle under conditions of stress and influence cognitive performances. There is a rather substantial body of literature suggesting that women do feel differently at different times during their menstrual cycle. There are some controlled studies which support the conclusion that anxiety and depression are higher during the premenstrual phase than inter-menstrual phase. [(3)] Trait anxiety score measured by the STAI of Speilberg used by Golub et. al[(3)] was unaffected during the menstrual phase. In a study conducted by Zita Tersman et. al[(4)] there was a significant phase related difference in cortisol levels in females during menstrual cycle. The cortisol level was at its highest during the late luteal phase with measurement being 371mmol/lit (SD±120) while in F-phase being 297mmol/lit (SD±98). Study of cortisol levels in saliva is being preferred over serum as saliva has many components which help detect systemic diseases and also provide biomarkers of health and disease status. Salivary assays present a lot of advantages when compared to blood assay: the sampling is very easy to do especially in a non medical environment; multiple samples could be collected providing more information than that of single blood sample[11].

OBJECTIVE

To asses the correlation between cortisol levels in different phases of menstrual cycle with anxiety scoring and hormonal status in normal healthy young females.

***STUDY DESIGN*:** Cohort study

MATERIALS AND METHODS

33 healthy female volunteers from 1st year MBBS course in the age group of 18-20 years all unmarried were recruited for the study. A detailed medical history was taken to rule out any major medical problem, especially psychiatric or endocrine problem. Each subject was studied for one complete cycle both in Luteal and Follicular phase. Saliva sample was collected mid cycle in both phase & anxiety scoring done by STAI. (Speilberg**)** Salivary cortisol level show diurnal variation hence a definite time was allotted for collection of sample & anxiety score at 4:00 PM evening. For anxiety scoring STAI (State Trait Anxiety Inventory) of Spielberg was used. A proforma was filled up by the subjects before the investigator and the grading for the questionnaire was analysed for the degree of anxiety in each subject.The students were enrolled in the study after taking informed consent for participation & ethical clearance of ethics committee of E.L.M.C.H Lucknow. Saliva sample was collected in a centrifuge tube; then centrifuged at 3000rpm per 5 minutes. The samples were stored at -20˚C until analysis. Cortisol concentrations in saliva were measured by competitive immunoenzymatic

colorimetric method (Diametra: according to manufacturer instructions)

RESULTS

The results were tabulated, mean & SD calculated and subjected to appropriate statistical analysis

Table 1
Anxiety score and biochemical parameter (Mean ± SD) of two groups

Variables	L- Phase (n=33)	F- Phase (n=33)	p value
State Anxiety Score (STAI)	49.73±5.70	49.73±5.70	>0.05
Serum Cortisol Level ng/ml	3.96±2.48	3.52±2.21	>0.05

Table 2
Correlation (n=33) between Serum cortisol and anxiety state level in different menstrual cycle phase

Variables	Scoring	L-Phase	F-Phase
State Anxiety Score (STAI)	1.00		
Serum Cortisol Level (ng/ml)	0.48	1.00	
Serum Cortisol Level (ng/ml)	-0.07	0.04	1.00

DISCUSSION

In the present study salivary cortisol level was measured in both phases of themenstrual cycle along with anxiety scoring by STAI (State Trait Anxiety index) in both phases there is no significant difference in mean value of cortisol levels in L and F-phase of the menstrual cycle. However, there is a significant correlation of anxiety score and cortisol level in L-phase, which shows an increasing trend, 3.96ng/ml in L-phase as compared to 3.52 ng/ml in F-phase. These findings corroborates with the result of earlier study where significant phase related differences in cortisol level are reported 371nmol/L (SD±120) in as compare to 297nmol/L (SD±91) in F-phase. There are large numbers of studies showing that women do feel differently during the menstrual cycle. [5, 6, 7]. In a study done by McCormik et al it was seen that the phases of the menstrual cycle were responsible for a significant variation(15%) in performance of female undergraduates in the spatial test that they took in their study to correlate it with stress levels and decreased cognition during menses.[8] Various phases of Menstrual cycle have been found to affect the psychophysiological stress responses . It has been seen that correlation of peak levels of cortisol and post task, subjective stress in women in the follicular phase has a negative association while a positive relation was seen in the group of women in the luteal phase . These findings suggest a possible role of sex hormones in regulating the cortisol stress response function[9] . One study has concluded that gender, menstrual cycle phase, and OC use exert important effects on HPA responsiveness to psychosocial stress in healthy subjects.[10] Hence, significant variation in cortisol levels and response to stress has been seen in various phases of menstrual cycle as has been seen in our study too.

CONCLUSION

Cortisol is an important aspect of the body's response to stress, although its equally important that body's relaxation response be activated so that body function return to normal.In normally menstruating women the salivary cortisol levels show positive correlation with luteal phase of menstrual cycle.

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