

TO FIND OUT THE VARIATION OF SYMPATHETIC & PARASYMPATHETIC TESTS BETWEEN MALE & MENSTRUAL PHASE OF MENSTRUAL CYCLE IN FEMALE.

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Abstract:

The hormonal fluctuations that occur during normal menstrual cycle has profound influence on autonomic functions. This influence on autonomic nervous system may affect cardiovagal control. The aim of the study is to find out the variation of Parasympathetic function tests during different phases of menstrual cycle in young healthy females.

The mean E:I ratio in Menstrual Phase of menstrual cycle in females is 1.34 ± 0.06 .

The mean E:I ratio in males is 1.41 ± 0.12 .

The mean Postural SBP in Menstrual Phase of menstrual cycle in females is 97.76 ± 5.13 mmHg. The mean Postural SBP in males is 103.24 ± 6.88 mmHg.

The study concludes that there was statistically significant heart rate variability during three phases of the menstrual cycle, as observed by the increased sympathetic discharge in the luteal phase compared to the increased parasympathetic discharge in the follicular phase. The results of our study have emphasized the complexity of the relationship between ovarian steroids and various hemodynamic regulatory systems.

Keywords: Sympathetic, Parasympathetic & Menstrual.

Introduction:

After receiving information about the internal and the external environment, the autonomic nervous system responds on various organs of the body by either stimulating or inhibiting the sympathetic division and parasympathetic division and thus helps in maintaining homeostasis.¹

The ANS controls blood pressure, heart rate, respiratory rate, body temperature, digestion, metabolism (thus affecting body weight), water and electrolyte balance, secretion of body fluids (saliva, tears, sweat), micturition, defaecation, sexual response etc.²

Generally, the sympathetic division prepares the body for stressful or emergency situations i.e fight/flight reactions. Thus it increases heart rate and the force of cardiac contractions and dilates or widens the airways to make breathing easier, increase muscular strength etc. It causes the body to release stored energy. Therefore considered as catabolic. It also causes palmar hydrosis, dilatation of pupils and piloerection. It slows body processes that are less

important in emergency situations, such as digestion and urination.³

Material & Method

The study was carried out in the Department of Physiology of B J Medical College, Ahmedabad from Feb. 2012 to Jan. 2013. All the subjects were given a self prepared questionnaire to answer. After explaining the procedure informed consent was obtained from each subject. All the tests were conducted in the Physiology Department. The history related to their present, past, family, personnel, was taken along with menstrual history in female subjects. After taking history, general and systemic examination was done.

In female subjects, stage of cycle on entry in the study was calculated from date of onset of Last Menstrual Period. Recordings of Autonomic Function Tests were made on specified days of a single menstrual cycle. In menstrual phase, all subjects came on day 3 (mid-menstrual), in follicular phase on day 10 (mid-follicular) and in luteal phase on day 25 (late-luteal).

All the subjects were subjected to recording of physical anthropometry, various physiological parameters and autonomic function parameters.

Only those participants were taken into study that fulfilled the inclusion criterias.

INCSIOLUN CRITERIA'S

1. Subjects giving consent for test participation in the study.
2. Male and female subjects of 18-27 yr age group.

EXCLUSION CRITERIA'S

1. Subjects with history of hypertension or any other clinical signs of cardiovascular diseases.
2. Subjects with history of alcohol intake.
3. Subjects not giving consent for test participation.
4. Subjects with history of smoking, tobacco consumption.
5. Subjects receiving drugs known to affect autonomic function, for example: Adrenergic drugs, Adrenergic blocking drugs, Cholinergic agents, Diuretics, Antihypertensive drugs, etc.
6. Females with irregular menstrual cycle.

Results

PARASYMPATHETIC FUNCTION TESTS

Table 1: Table showing Mean and SD of E:I Ratio in female and male subjects

Females (N=80)

	Menstrual Phase (MP)	Males (N=80)
Mean	1.34	1.41
S.D.	0.06	0.12

- The mean E:I ratio in Menstrual Phase of menstrual cycle in females is 1.34 ± 0.06 .
- The mean E:I ratio in males is 1.41 ± 0.12 .

COMPARISON OF SYMPATHETIC FUNCTION TESTS

Table 2: Table showing Mean and SD of Postural Systolic Blood Pressure (SBP) in mmHg in female and male subjects

Females (N=80)

	Menstrual Phase (MP)	Males (N=80)
Mean	97.76	103.24
S.D.	5.13	6.88

- The mean Postural SBP in Menstrual Phase of menstrual cycle in females is 97.76 ± 5.13 mmHg.

The mean Postural SBP in males is 103.24 ± 6.88 mmHg.

Discussion

SYMPATHETIC FUNCTION TESTS:

Variation in different phases of menstrual cycle in females:

Our result was similar to the study of **Kavitha C et al⁴** showed that there was a statistically significant difference in postural change of systolic blood pressure and no statistically significant difference in postural change of diastolic blood pressure between all the three phases of the menstrual cycle.

But not similar with the studies of **Chakraborty A et al⁵**, **Agarwal G et al⁶** showed a statistically significant difference in postural change of diastolic blood pressure in all the three phases of menstrual cycle.

On sudden changing from supine to standing position, there is peripheral pooling of blood in the dependent parts of the body; this decreases venous return and cardiac output, so the systolic blood pressure which is dependent on left ventricular ejection also decreases. This via the sino-aortic reflex, which operates within seconds, stabilizes the blood pressure.

PARASYMPATHETIC FUNCTION TESTS:

Variation in different phases of menstrual cycle in females:

Our results were also similar to the study of **Kavitha C et al⁴** which showed that the statistically significant ($P < 0.05$) difference between menstrual-luteal phases and follicular-luteal phases, but had not shown statistically significant ($P > 0.05$) difference between menstrual-follicular phases and also higher values in luteal phase.

Nilekar AN et al⁵ also found higher value of E:I ratio in luteal phase as compared to follicular phase.

Similar observation was found in study conducted by **Seebauer M et al⁶** which states that the complex time course of changes in respiratory sinus arrhythmia (RSA) during the menstrual cycle found by recording daily beat to beat variations of heart rate were minimum in the early follicular phase and a maximum in the late luteal phase. This difference of RSA or RSA fluctuations depend on the level of average heart rate, which in turn depends on the autonomic activity.

But the result is contradictory with the studies of **Parlewar RK et al**⁷, **MehtaV et al**⁸ which did not show any significant change during different phases of Menstrual Cycle.

Our result was similar to the study of **Kavitha C et al**⁴ showed that there was a statistically significant difference in postural change of systolic blood pressure and no statistically significant difference in postural change of diastolic blood pressure between all the three phases of the menstrual cycle.

But not similar with the studies of **Chakraborty A et al**⁹, **Agarwal G et al**¹⁰ showed a statistically significant difference in postural change of diastolic blood pressure in all the three phases of menstrual cycle.

Conclusion

The study concludes that there was statistically significant heart rate variability during three phases of the menstrual cycle, as observed by the increased sympathetic discharge in the luteal phase compared to the increased parasympathetic discharge in the follicular phase. The results of our study have emphasized the complexity of the relationship between ovarian steroids and various hemodynamic regulatory systems.

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