

Sympathetic & Parasympathetic Tests between Male Medical Students & Luteal Phase of Menstrual Cycle in Female Medical Students at Tertiary Care Centre of Central India

Dr. Priyanka Chouhan¹, Dr. Prabhat Kumar Budholia^{2*}

¹Junior Resident, Dept. of Physiology, Netaji Subhash Chandra Bose Medical College, Jabalpur, Madhya Pradesh, India

²Assoc. Prof., Dept. of Physiology, Netaji Subhash Chandra Bose Medical College, Jabalpur, Madhya Pradesh, India

***Corresponding author**

*Dr. Prabhat Kumar
Budholia*

Article History

Received: 16.05.2018

Accepted: 27.05.2018

Published: 30.05.2018

DOI:

10.21276/sjm.2018.3.5.18



Abstract: Sympathetic & Parasympathetic test status may be changed during follicular and late luteal phases of menstrual cycle due to fluctuations of serum estrogen and progesterone levels. Objective is to find out. Sympathetic & Parasympathetic tests between male medical students & luteal phase of menstrual cycle in female medical students. This study evaluates autonomic function tests in different phases of menstrual cycle and concludes that sympathetic activity is highest during luteal phase and lowest in the follicular phase. It is concluded that there is higher sympathetic activity in males as compared to females

Keywords: Sympathetic, Parasympathetic, Luteal phase, Menstrual Cycle, Females.

INTRODUCTION

Regular menstrual cycle is an index of women's normal reproductive health. It includes follicular phase and luteal phase[1]. The biological rhythmicity of the cycle is created by the interplay among hypothalamic, hypophyseal and ovarian hormones [2]. The fluctuations in hormonal levels affect not only the female reproductive tract but also many other tissues of the body. Variations in the autonomic nerve function status may also be related to these fluctuations [3]. However, altered functioning of autonomic nervous system in late luteal phase may be responsible for this PMS or in severe case PMDD in eumenorrhic women. Alterations in autonomic nerve functions may affect cardiacvagal control and usually associated with decreased parasympathetic activity in late luteal phase.

MATERIALS & METHODS

Study period

The duration of the study was one year i.e. from June-16 to May-17.

Study Designed: Cross-sectional type.

Method of collection of data

The study was carried out in the Department of Physiology of Netaji Subhash Chandra Bose Medical College, Jabalpur (M.P.). 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 day10 (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.

Inclusion criteria's

- Male and female subjects of 18-25 yr age group.
- Subjects giving consent for test participation in the study.

Exclusion criteria's

- Subjects not giving consent for test participation.
- Subjects with history of alcohol intake.
- Subjects with history of smoking, tobacco consumption.
- Subjects with history of hypertension or any other clinical signs of cardiovascular diseases.
- Subjects receiving drugs known to affect autonomic function, for example: Adrenergic

drugs, Adrenergic blocking drugs, cholinergic agents, Diuretics, Antihypertensive drugs, etc.

- Females with irregular menstrual cycle.

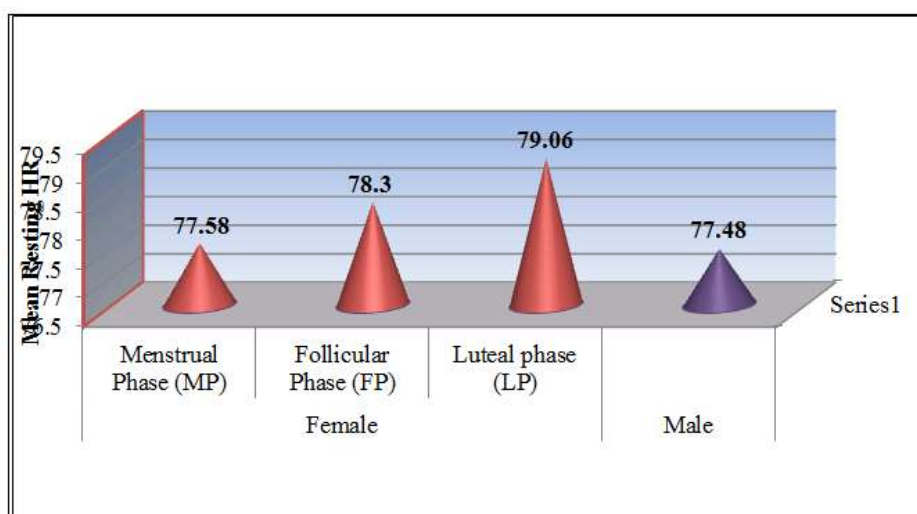
RESULTS

Table-1: Table showing Mean and SD of Resting Heart Rate (RHR) in beats/minute in female and male subjects

	Females (N=50)			Males (N=50)
	Menstrual Phase (MP)	Follicular Phase (FP)	Luteal phase (LP)	
Mean	77.58	78.30	79.06	77.48
S.D.	4.37	4.44	4.41	4.06

The mean resting heart rate in Menstrual Phase of menstrual cycle in females is 77.58 ± 4.37 /min. The mean resting heart rate in Follicular Phase of menstrual cycle in females is 78.30 ± 4.44 /min. The mean resting

heart rate in Luteal Phase of menstrual cycle in females is 79.06 ± 4.41 /min. The mean resting heart rate in Males is 77.48 ± 4.06 /min.



Graph-1: Comparison of Mean Resting HR in males and 3 different phases of menstrual cycle in females

DISCUSSION

This study shows that the mean RHR in Menstrual Phase of females was 77.58 ± 4.37 /min, mean RHR in Follicular Phase of females was 78.30 ± 4.44 /min, mean RHR in Luteal Phase of females was 79.06 ± 4.41 /min and mean RHR in Males was 77.48 ± 4.06 /min.

Our results were also similar with the study conducted by

Kavitha C *et al.* showed statistically significant differences in- menstrual-follicular, follicular-luteal and luteal- menstrual phases [4].

Christina *et al.* showed statistically significant differences in-follicular-luteal and luteal- menstrual phases, but contradictory with the study conducted by R K Parlewar *et al.* Mehta V *et al.* Leicht AS *et al.* did not show any significant change during different phases of menstrual cycle [5,6,10,11].

Choudhury R *et al.* Nilekar AN *et al.* which showed statistically significant difference in follicular and luteal phases [7,9].

Hirshoren N *et al.* Plasma renin activity, aldosterone concentrations and the concentrations of fluid regulatory hormones increased along the luteal phase, whereas rest supine corrected haematocrit declined in the course of the menstrual cycle. The plasma norepinephrine (NE) levels decreased from early follicular to the late follicular phase; thereafter the concentration gradually returned to early follicular levels. The menstrual cycle hormone changes has effects on both the neuro-humoral and the autonomic nervous system regulating the cardiovascular system[8].

Palmero F *et al.* observed that in the premenstrual phase i.e. luteal phase, premenstrual symptoms (PMS) group showed significantly higher resting HR levels than women without premenstrual symptoms (NPMS) group[12].

Seebauer M *et al.* Pronounced changes in the heart rate during menstrual cycle was found, with a minimum in the early follicular phase and a maximum in the late luteal phase which depends on vagal tone [13].

Moran VH *et al.* Resting heart rate was significantly higher in both the ovulatory and luteal

phases than in the menstrual and follicular phases. There exists a pattern of menstrual cycle related variation in cardiovascular functioning, which can be related to the established actions of the ovarian steroids[14].

CONCLUSION

This study evaluates autonomic function tests in different phases of menstrual cycle and concludes that sympathetic activity is highest during luteal phase and lowest in the follicular phase. It is concluded that there is higher sympathetic activity in males as compared to females

REFERENCES

1. Hall, J.E. (2011). Text Book of Medical Physiology. 12th ed. Philadelphia: SB Saunders. 1012p.
2. Cooke, W. H., Ludwig, D. A., ECKBERG, D. L., & CONVERTINO, V. A. (2002). Does the menstrual cycle influence the sensitivity of vagally mediated baroreflexes?. *Clinical Science*, 102(6), 639-644.
3. Hirshoren, N., Tzoran, I., Makrienko, I., Edoute, Y., Plawner, M. M., Itskovitz-Eldor, J., & Jacob, G. (2002). Menstrual cycle effects on the neurohumoral and autonomic nervous systems regulating the cardiovascular system. *The Journal of Clinical Endocrinology & Metabolism*, 87(4), 1569-1575.
4. Kavitha, C., Jamun, A. B., & Kumar, V. (2012). Cardiac Chronotropism And Sympathovagal Balance In Young Women Of Reproductive Age. *International Journal of Biological & Medical Research*, 3(4), 2313-18.
5. Parlewar, R. K., & Venkatraman, B. (2015). Parasympathetic Functions Study during Different Phases of Menstrual Cycle.
6. Christina, K. F. K., Medabala, T., Patil, P., & Sayana, S. B. (2013). A Comparative Study of Cardiovascular Autonomic Function Tests during Different Phases of Menstrual Cycle.- *International Journal of Health Sciences and Research (IJHSR)*, 3(6), 34-40.
7. Choudhury, R., Jahan, N., Sultana, N., Akter, R., & Khanum, A. A. (2011). Parasympathetic Nerve Function Status During Different Phases Of Menstrual Cycle In Healthy Young Women.
8. Hirshoren, N., Tzoran, I., Makrienko, I., Edoute, Y., Plawner, M. M., Itskovitz-Eldor, J., & Jacob, G. (2002). Menstrual cycle effects on the neurohumoral and autonomic nervous systems regulating the cardiovascular system. *The Journal of Clinical Endocrinology & Metabolism*, 87(4), 1569-1575.
9. Nilekar, A. N., Patil, V. V., Kulkarni, S., & Vatve, M. (2011). Autonomic function tests during pre and post menstrual phases in young women. *Pravara Med Rev*, 3(2).
10. Mehta, V., & Chakrabarty, A. S. (1993). Autonomic functions during different phases of menstrual cycle. *Indian journal of physiology and pharmacology*, 37(1), 56-58.
11. Leicht, A. S., Hirning, D. A., & Allen, G. D. (2003). Heart rate variability and endogenous sex hormones during the menstrual cycle in young women. *Experimental physiology*, 88(3), 441-446.
12. Palmero, F., & Cholz, M. (1991). Resting heart rate (HR) in women with and without premenstrual symptoms (PMS). *Journal of behavioral medicine*, 14(2), 125-139.
13. Seebauer, M., Frühwirth, M., & Moser, M. (2002). Changes of respiratory sinus arrhythmia during the menstrual cycle depend on average heart rate. *European journal of applied physiology*, 87(4-5), 309-314.
14. Moran, V. H., Leathard, H. L., & Coley, J. (2000). Cardiovascular functioning during the menstrual cycle. *Clinical Physiology and Functional Imaging*, 20(6), 496-504.