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Study of Changes in QTc Interval with Menstrual Cycle in Young Adult Female Basket Ball Players

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Abstract

Objective: Study of changes in QTc interval with menstrual cycle in young adult female basketball players.

Method: Healthy young female adults in the age group of 18-22 years physicaly fit subjects were selected among general population. Sample size was 40. Parameters of ECG, QT interval, RR interval, QTc Interval were recorded during different phases of menstrual cycle.

Mean and Standard deviation was calculated.

Results: There was significant rise in QTc Interval recorded during menstrual phase

Conclusion: Women are at risk of developing ventricular arrhythmias during menstrual phase as compared to Proliferative and Secretory phase.

Keywords: *Corrected QT interval (QTc), Ventricular arrhythmias, gonadal hormones.*

Introduction

Gonadal Hormones influence the cardiovascular system by affecting repolarization or via autonomic nervous system. Estrogen and Progesterone bring about changes in blood pressure, blood volume, heart rate and vascular tone. These hormnes have influence on ventricular extrasystole and arrythmias. (1, 2)

Aims &objective: Study of changes in QTc interval with mensrual cycle in young adult female basketball players.

Materials and Method: Healthy young female adults in the age group of 18-22 years physicaly fit subjects playing basketball were selected among general population. Sample size was 40. Parameters of ECG, QT interval, RRinterval, QTc interval were recorded during different phases of menstrual cycle.

Materials: AD instrument Powerlab (Model-ML870, Serial#830-0732).

AD Instruments provides computer-based data acquisition systems for research and education. Powerlab data acquisition systems and choice of LabChart, LabTutor and LabAuthor software, provide outstanding data acquisition, display, analysis and authoring features for a wide range of life science applications. Since 1988, Powerlab (also MacLab) systems have been used for data acquisition and analysis by the world's best academic, government and private organizations. Powerlab systems combine software-controlled input of parameters, extensive signal conditioning options, variable sampling speeds and powerful real-time computations with the advantages of computer-based data display and analysis. They offer the functionality of a chart recorder, XYT plotter, digital voltmeter and storage oscilloscope in one compact unit. LabChart software, supplied with Powerlab systems helps in analysing the data. In the present study by using Powerlab Heart rate measurement, ECG recordings were done on subjects in supine posture.

Methodology: The study was conducted in the research laboratory, department of Physiology,. Informed and written consent was taken from the subjects who underwent the study with their own will and wish. Ethical clearence was taken from our institute.

Inclusion Criteria:

- Young healthy adults female subjects playing basketball in the age group of 18-22yrs
- Female with regular menstrual cycle

- Non obese BMI 18-22.9 kg/m2.
- Non smoker
- Non alcoholic
- Euglycemic

Exclusion criteria

- H/o Migraine, Diabetis Mellitus, Hypertension
- Any systemic illness
- Any Drug history
- Habitual disorders including smoking, alcoholism

Subjects were asked to lie down in supine position.

All subjects had regular mestrual cycle and none was taking any medication.

Baseline ECG was recorded: RR interval and QT interval were recorded. Corrected QT was recorded using formula QTc =QT/√RR. Recordings of ECG are made in Proliferative and Secretory.

And menstrual phase.

Statistical Analysis: Mean and Standard deviation was calculated. Data were tested for significance using ANOVA. Microsoft Excel and EPI-INFO package were used for data entry and statistical analyses respectively. Paired t-test was applied at 5% level to test the significance of changes in above parameters

Results

Table showing Changes in QTc interval with phases of Menstrual Cycle

Phase	Mean	S.D.
Menstrual	428.65	36.17
Proliferative	407.12	18.65
Secretory	409.79	22.89

P value <0.05

QTc interval is more during menstrual phase as compared to Proliferative and Secretory phase.

Discussion

Gonadal hormones Estrogen and Progesterone increase muscarnic cholinergic activity.[4]

They also regulate Calcium uptake in cardiac muscle.[5, 8]

Estrogen levels are lowest in menstrual phase, there is increase in heart rate and reduced RR interval menstrual phase [6, 7]

QTc Interval is inversly prportional to RR Interval[3]

QTc Interval is more in mensrual phase than Proliferative and Secretory phase.

Conclusion

There is variation of QTc Interval with menstrual cycle. Women are at risk of developing ventricular arrhythmias during menstrual phase as compared to Proliferative and Secretory phase. Estrogen is cardioprotective hormone.

Conflict of Interest: Nil

Ethical Clearance: Ethical clearance was obtained from the institutional ethical clearance committee.

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