

ELECTROCARDIOGRAPHIC VARIATION MANIFESTED DURING MENSTRUATION

by

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Introduction

The fact that menstruation is concerned with constantly repeated haemorrhages may lead one to think of the possibility that this may affect the circulatory system. Blood volume of ovariectomized women was from 20 to 25 per cent less than normal as was observed by Friedlander *et al* (1936). They showed that blood volume can be restored to normal values by oestrogen administration. If artificially administered oestrogen has so much effect on the blood volume then the naturally occurring marked variations in oestrogen level in blood during the menstrual cycle, must affect the blood volume of the normal women. Since blood volume is one of the important factors to influence the cardiac activity, there is every likelihood that blood volume changes during the menstrual cycle may manifest some changes in electrocardiographic pattern.

Material and Methods

One hundred twenty four females were selected for studying the effect of menstruation. The age of the group varied from 20 to 35 years. Females studied for the menstrual effect, were all having

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regular periods. The range of menstrual cycle was from 26 to 30 days and the menstruation lasted for 3 to 4 days. Cases of menorrhagia or any other type of gynaecological disorders were not included.

E.C.G. were taken twice on each subject, on the second day of menstruation and after two weeks of menstruation. The type of electrocardiograph used here for recording the E.C.G. is the "CARDIO-MAT" (Siemens Co., W. Germany).

On the second day of menstruation, the subject for study was asked to come after a light breakfast. As usual before taking E.C.G., subjects were asked to lie on the non-conductor, comfortable bed for 20 minutes. E.C.G. was taken with 12-leads. E.C.G. was taken on the same subject for the second time after two weeks of menstruation. Electrocardiograms were recorded in each case more or less at the same time of the day.

Results

One hundred twenty four normal healthy females of age 20 to 35 years were selected to study changes manifested in the electrocardiogram during the menstrual cycle. E.C.Gs. were taken only twice during the menstrual cycle in each subject. During the bleeding phase one E.C.G. was taken and the other one was taken after 2 weeks.

The significant differences marked during the bleeding phase of menstruation were: (i) increase of heart rate, and (ii) lowering of T-wave amplitude. On the other hand, there was presence of (i) relative decrease of heart rate, and (ii) increase of amplitude of T-wave in the E.C.G. taken after 2 weeks in the same individuals.

Figs. 1 and 2 show E.C.G. difference in the same individual during the two different phases of menstrual cycle.

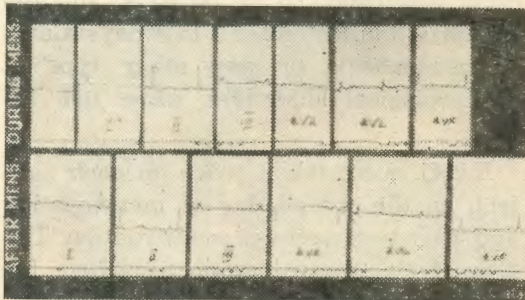


Fig. 1

Electrocardiographic changes during and after menstruation.

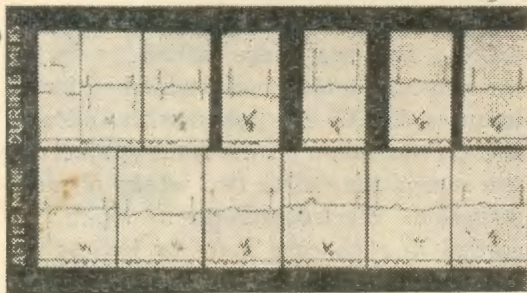


Fig. 2

Electrocardiographic changes during and after menstruation.

Table 1 shows the changes observed during the menstruation and after two weeks on heart rate and T-wave amplitude.

Discussion

Menstruation is not a single isolated phenomenon. It is one of the sequence of events characterized by not only cyclic histochemical changes in the female pelvic organs, but also affecting the whole organism. Now it is recognised that important systemic changes accompany the various phases of the menstrual cycle.

According to Katz (1947), some of the fluctuations encountered in electrocardiogram during the menstrual cycle may be attributed directly or indirectly to the hormonal disturbances. However, he says that it requires further study.

The T-wave amplitude is diminished during the bleeding phase. Heart rate and T-wave are inversely proportional. This correlates with the findings of Sjostrand (1950).

Beside this, the serum electrolyte potassium level is said to gain a definite rise around ovulation and to attain low levels during menstruation (Fenn, 1940); this also may be an attributing factor for the T-wave change obtained here (Lanari *et al*, 1964).

Summary

Electrocardiograms were taken only twice during the menstrual cycle on

TABLE 1
The Mean Heart Rate and T-Wave Amplitude During and After Menstruation

	During menstruation	After menstruation
Heart Rate (Per Minute)	85 ± 10	72 ± 8
T-Wave Amplitude (in mm.)	4.5 ± 1.5	5.5 ± 2

healthy young females of age 20 and 35 years. During the bleeding phase one E.C.G. was taken, and the other one was taken after 2 weeks. Electrocardiograms taken during the bleeding phase of menstrual cycle presented significant changes from those recorded after 2 weeks. During bleeding phase, the E.C.G. showed: (i) increase of heart rate, and (ii) Lowering of T-wave. On the other hand, there was presence of (i) relative decrease of heart rate, and (ii) increase of amplitude of T-wave in electrocardiograms taken after 2 weeks in the same individuals.

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