

INFLUENCE OF HELIOGEOPHYSICAL ACTIVITY ON A FUNCTIONAL STATE OF CARDIOVASCULAR SYSTEM OF A HUMAN BEING

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Abstract

To reveal the influence of heliogeophysical activity on a functional condition of cardiovascular system of a human being, the experiment on measuring the conductivity of biologically active points (BAP) connected with the heart and vessels from the point of view of anatomical-information relationship using a method of Voll electroacupuncture diagnostics with the help of the electronic device "Diafol" has been carried out. The number of calls for the emergency medical care for patients suffering a cardiovascular pathology in Yakutsk and the parameters of BAP conductivity both have shown that by means of the Voll method the diagnostics of cardiovascular system is possible. The comparison of slow changes of BAP conductivity parameters with K-index has shown the coincidence of trends with a high value of correlation coefficient.

Introduction

Cardiovascular diseases remain an actual problem in modern medicine. Numerous studies show that one of the reasons of cardiovascular disease exacerbation is the change of electromagnetic parameters of the environment connected with a heliogeophysical disturbance. One of the strong factors having an effect upon the condition of patients is a geophysical disturbance [1, 2]. During the geophysical disturbance (caused by a change of solar activity) the following factors affect a human organism: infrasound appearing during aurorae at high latitudes; micropulsations of the Earth's magnetic field as short-period magnetic field oscillations; electromagnetic radiation [3] etc.

All these factors themselves are not a reason for diseases. They are only factors providing heart and vessel disease complications.

By present time much scientific information on this problem has been collected. However, study results by some authors are discrepant.

The aim of the present work is to study possibilities of the device "Diafol" for the registration of cardiovascular system state of human being objectively, and also to find relationship of cardiovascular disease exacerbation to a geophysical disturbance.

Experimental data and registration methods

Data on a geomagnetic activity (K-index) have been obtained from a set of observation data of IKFIA of Siberian Branch of the Russian Academy of Sciences.

Medical information has been taken from the emergency medical care office in Yakutsk. Medical data are the number of calls for the emergency medical care for patients suffering from a cardiovascular pathology on the occasion of hypertensive disease (HD), hypertonic crisis (HC), myocardial infarction (MI), acute impairment of cerebral circulation (AICC), and also for cardiovascular patients being registered in a dispensary (Д-registration). Besides that, to confirm the opportunity to diagnose the cardiovascular system state of a human being using the Voll method and to reveal the relationship of cardiovascular system state dynamics of a human being to geophysical disturbances, the data of special experiment have been used. The experiment has been carried out with the help of a group of volunteers. The experiment has consisted in measuring the conductivity of their biologically active points (BAP) describing a state of heart and vessels using the method of Voll electroacupuncture diagnostics from January to June, 2005.

The basis for this Voll method is the definition of electrical conductivity of acupuncture points. Acupuncture points reflect a functional condition of organ (system) of a human being. The BAP electrical conductivity measurement allows to obtain information on the state of patients heart and vessels [6, 7].

The device consist of 2 kinds of electrodes: active and passive ones which are connected with PC loaded with a special program. The patient holds a passive electrode, the laboratory assistant finds the BAPs determining the state of heart and vessels using a probe. The value of BAP conductivity is brought to the PC screen. To find BAPs the anatomical orientations are used and in the area of phalanxes the place of transition of a phalanx's head into a body or the place of transition of the phalanx's body into a root are used.

Results and discussion

If geophysical factors really have an effect on a physiological state of biological objects, in particular, on a human being, then in the dynamics of cardiovascular system state of a human being there should be changes observable in geophysical parameters.

A group of 29 volunteers of various age, sex and physical health participated in the experiment. During 6 months from January to June 2005 the device "Diafol" read daily indications of volunteers' definite representative points connected with heart and vessels from the point of view of anatomical-information relationship. To define the state of cardiovascular system of patients the arithmetic-mean value of BAP conductivity connected with heart and vessels has been taken. Thus, for each patient an individual number of data for the whole period of experiment has been obtained. Then, for the purpose of creation of a continuous number of data the index interpolation of each volunteer has been carried out (Fig. 1).

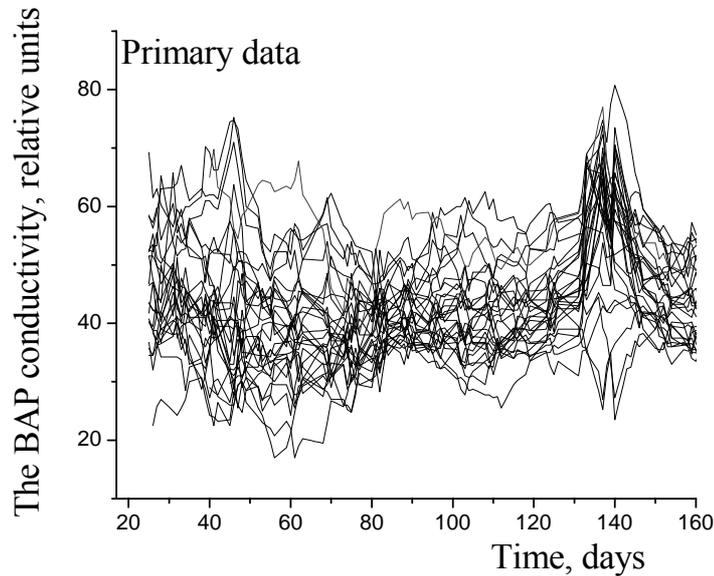


Fig.1. The primary data of BAP conductivity connected with a heart and vessels from the point of view of anatomical-information relationship describing the change of a cardiovascular system functional state of volunteers.

For the purpose of finding a possible connection between slow changes of BAP conductivity reflecting a cardiovascular system, functioning by the number of calls for the emergency medical care apropos of cardiovascular diseases and the level of geomagnetic disturbance the interpolated data of all above parameters have been filtered with a smoothing period of 40 days.

The examinees trends obtained have shown that in the processed data two types of a change of BAP conductivity are dominated. According to specific changes of the BAP conductivity these two groups have been named "Hollow" and "Growth" (see Fig. 2, 3). In Figure on the ordinate the BAP conductivity index in relative units describing a functional state of heart and vessels and on the axis the time in days from the beginning of the year are plotted. The change of BAP conductivity of one person from the group of examinees has not shown a reaction typical for both groups. The group "growth" is characterized by a constant increase of BAP conductivity and the group "hollow" has shown firstly a decrease (from 17 up to 80 days), and then an increase (from 85 up to 150 days) of conductivity indices for the whole period of experiment.

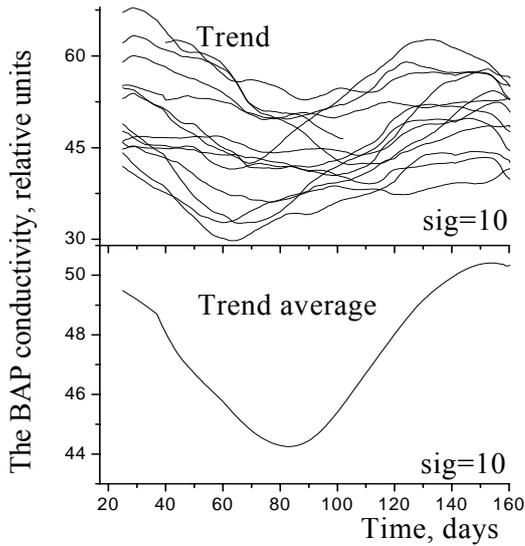


Fig. 2 Change of the BAP conductivity of «Hollow» group.

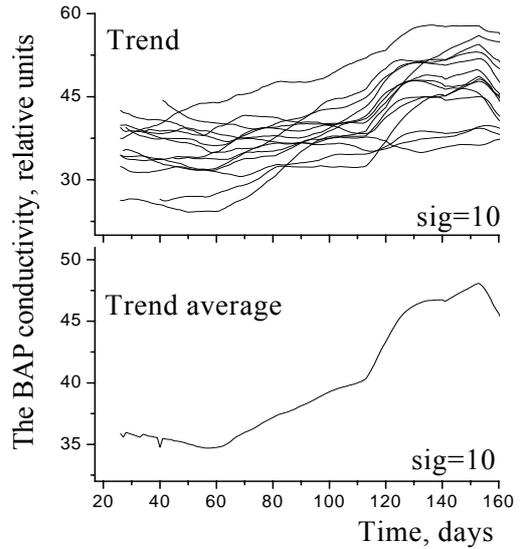


Fig. 3 Change of the BAP conductivity of «Growth» group.

In the examinee group there are only 29 persons. Among them there are 9 men: at the age of 18-30 years- 1, 30-45 years- 3, 45-60 years- 5 persons; and 20 women: at the age of 41-50 years- 5, 50-59 years- 3, 60-69 years- 5 persons. The comparison of personal data of volunteers of the group "Hollow" with the group "Growth" has shown that in the group "Growth" the middle age of volunteers is 50,7 years old (10 women at the age of 34 - 67 years old, 4 men at the age of 40-58 years old). In the group "Hollow" the middle age of participants is 42,3 years old (10 women at the age of 27- 68 years old, 4 men at the age of 18 -48 years old). From these data it follows that a sex of volunteers has no definite distribution in groups, and the comparison in age has shown that younger people are in the group "Hollow".

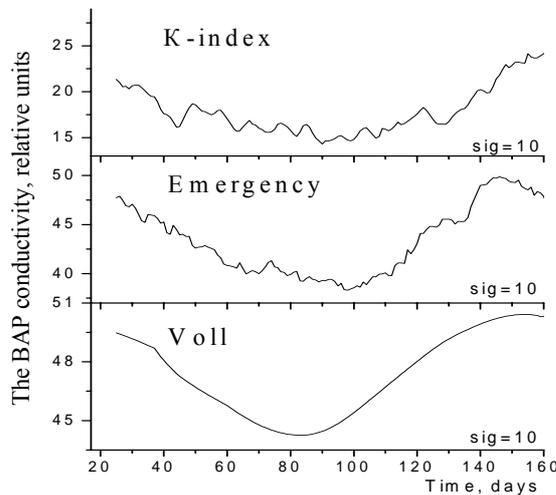


Fig. 4 Trends of K-index, number of calls for the emergency medical care for patients suffering from cardiovascular pathology in Yakutsk, BAP conductivity of volunteers of the group "Hollow"

The state of cardiovascular system of the above groups has been compared with data treated in the same way like data of the number of calls for the emergency medical care for patients suffering from a cardiovascular pathology and also with K-index. The trend of group "Hollow" coincides with the medical parameters and K-index. It is seen from Fig. 4 that temporal changes of the electroconductivity trend of BAPs responsible for the functional condition of heart and vessels coincide with the trend of the number of calls for the emergency medical care apropos of cardiovascular diseases and the trend of geomagnetic disturbance (K-index). To confirm the coincidence defined visually of temporal changes of BAP electroconductivity trends (the group "Hollow"), the numbers of calls of the emergency medical care apropos of cardiovascular diseases and k-index we'll use the method of correlation

analysis. The correlation coefficient of the trend of calls for the emergency medical care apropos of cardiovascular diseases with the K-index trend is 0,876.

The correlation coefficient of trend of medical parameters with the trend of K-index is 0,876. The correlation coefficient of K-index trend with the BAP electrical conductivity trend (the group "Hollow ") is 0,885 and the correlation coefficient of BAP electroconductivity trend (the group "Hollow") with the trend of the number of calls for the emergency medical care is 0,96. Thus, a visual similarity, and also high values of correlation coefficients between and of BAP conductivity reflect of cardiovascular system state of a person, show an opportunity to diagnose a cardiovascular system state of a person with the help of Voll method. Besides that, the coincidence of changes of the number of calls for the emergency medical care, conductivity of BAP and K-index of geomagnetic disturbance is indicative of the probable influence of geomagnetic disturbance on the cardiovascular system state of a human being.

The coincidence of changes of BAP conductivity of the "Hollow" group with the changes of geomagnetic activity can testify about the natural reaction of relatively healthy organism to the geomagnetic activity. Since the age of volunteers in the "Hollow" group (middle age is 42,3 years old) is less than in the "Growth" group (middle age is 50,7 years old) it is possible to make a conclusion that the age is the factor defining the reaction of person's organism of the to the external influence.

Conclusions

1. The comparison of slow changes (trends) of the number of calls for the emergency medical care for patients suffering from cardiovascular diseases and conductivity of BAPs describing a state of heart and vessels of half of volunteers, has shown their similarity with a high value of correlation coefficient. Thus, the opportunity to diagnose a cardiovascular system state of a human being is confirmed with the help of Voll method.
2. The coincidence of trends of the number of calls for the emergency medical care for patients suffering from cardiovascular diseases and conductivity of BAPs characterising a state of heart and vessels of the second part of volunteers with the trend of K-index characterising the geomagnetic disturbance is found. On the basis of it the conclusion about the influence of geomagnetic disturbance on the cardiovascular system state of definite part of people is made.

References

1. Agadzhanyan N.A., Oraevsky V.N., Makarova I.I., Kanonidi H.D. Medicobiologic effects of geomagnetic disturbances. M.: IZMIRAN, 2001. P. 47-50.(in Russian).
2. Chibisov S.N. Influence of geomagnetic activity on a contractive function of animals' heart // Contemporary problems of the study and preservation of the biosphere. SPT: Gidrometeoizdat, 1992. V. 2. P.51.(in Russian).
3. Oraevsky V.N., Gurfinkel Yu.I., Guseva A.V., et al..Medicobiologic effects of natural electromagnetic variations. // Correlations of biological and physicochemical processes with space and heliogeophysical factors. Pushchino, 1996. - P.39.(in Russian).
4. Mitrofanov A.P., Brylyakov A. L. Manual on electropuncture diagnostics. Kursk. AP "Kursk", 1993. P. 9-11(in Russian).
5. Roller I.S., Samokhin A.V., Fursov S. E. Reference book on representative points of R.Voll electropuncture . M.: MTs "System", 1991. P. 5-7. (in Russian)