

## **ANALYSIS OF LONG-TERM PROGNOSIS INDICATORS OF DISPERSION MAPPING IN PATIENTS WITH CARDIAC PATHOLOGY**

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Purpose: to evaluate the use of indicators of dispersion mapping for the long-term prediction of adverse cardiovascular events in patients with cardiovascular diseases (CVD). The study included data of 217 people with using short recordings in dynamics throughout the year (winter, spring, summer and autumn). The 1<sup>st</sup> group consists of 64 patients with hypertension, the 2<sup>nd</sup> group - 44 patients with coronary heart disease, the 3<sup>rd</sup> - 30 patients with cardiomyopathy and in the 4<sup>th</sup> group of 28 patients with coronary artery disease and diabetes mellitus. The control group consisted of 51 healthy individuals (18 men and 33 women) ranging in age from 29 to 53 years. Cardiac output was higher in the group of survivors ( $54.6 \pm 0,5\%$ ) compared with the group with unfavorable outcome ( $33.8 \pm 2,2\%$ ). The average values of all the indicators of dispersion mapping were higher in the group of death with the exception of heart rate index/IMM, indicating more severe violations. Noteworthy increase in 2 times the rate of alterative T wave at tT1 (Tbig) and T2 (Tmax) points. The sensitivity and specificity of the prediction of fatal outcome during 3 years of observation for record  $IMM > 25\%$  was 54% and 61%.

Key words: ECG dispersion mapping, changes in the electrophysiological properties of the myocardium, alcohol, cardiovascular disease, remote forecast

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## **MAGNETOCARDIOGRAPHIC QRS COMPLEX IN PATIENTS WITH PAROXYSMAL ATRIAL FIBRILLATION AND CHRONIC OBSTRUCTIVE PULMONARY DISEASE**

G.G. Ivanov, N.A. Bulanova, V.A. Vostrikov, V.E. Dvornikov, N.A. Chuiko, G. Halabi, M.R. Aleksandrova, Yu.V. Maslennikov, M.A. Prinin, I.V. Nedaivoda

In this study, the analysis of magnetocardiographic (MCG) data for the three groups of patients is given. The first group included 31 healthy volunteers, who had no "history" of a heart disease. The second group included MCG record of 51 patients with chronic obstructive pulmonary disease (COPD). The third group consisted of 31 MCG records for patients with paroxysmal atrial fibrillation (AF). Founded advantages of MCG to potential method provide registration and mapping features of electrophysiological processes in the heart, when the change takes place at the MCG and often absent on ECG.

Key words: magnetocardiography, P wave, chronic obstructive pulmonary disease, paroxysmal atrial fibrillation.

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## **MAGNETOCARDIOGRAPHY IN THE DIAGNOSIS OF LESIONS FIBRILLATION IN PATIENTS WITH COPD AND ACA**

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Paper is devoted to the study of MCG in the diagnosis of lesions of the Atria. Studied indicators in the group of healthy individuals (n = 19) using functional tests (Shtange, Valsalva

and tensor), the 2nd group of patients (n = 55) — with chronic obstructive pulmonary disease (COPD) at the age of  $54 \pm 8$  yrs (32 of them with berodual or symbicort test) and the 3rd group — with ACA on the background of coronary artery disease and hypertension at the age of  $58 \pm 6$  yrs (n = 30) time Analysis of intra- and interatrial conduction with ACA and COPD showed similar violations of MCG in these groups, which can be induction and maintenance factors of atrial fibrillation. MCG method can be used to assess the electrophysiological status of the myocardium of the Atria.

Key words: Magnetocardiography, P-wave, chronic obstructive pulmonary disease, paroxysmal of atrial fibrillation.

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### **AUTOMATIC CLASSIFICATION OF PATIENT GROUPS USING MAGNETOCARDIOGRAPHY IN THE DIAGNOSIS OF THE ATRIA LESIONS IN PATIENTS WITH CHRONIC OBSTRUCTIVE PULMONARY DISEASE AND CORONARY HEART DISEASE**

G.G. Ivanov, N.A. Bulanova, V.A. Vostrikov, V.E. Dvornikov, N.A. Chuiko, G. Halabi, Yu.V. Maslennikov M.A. Prinin, I.V. Nedaivoda S.Yu. Kuznetsova, V.N. Gunava

The work is devoted to study the possibilities of automatic classification of patient groups using magnetocardiography (MCG) in the diagnosis of lesions of the atria. Analyzed magnetocardiographic data for the three groups of patients. The first group included 31 MCG record healthy volunteers. The second group — 45 MCG records of patients with chronic obstructive pulmonary disease (COPD). The third group — 58 MG records of patients with coronary heart disease (CHD). Statistical analysis showed that the decision rule for classification of patients with COPD and IHD can have four information parameter: 1 — the rate of variation of the magnetic field (RVMF), which characterizes the percentage of exceeding a given level of magnetic field in the whole time interval (104 msec), points on the plane dimensions of each magnetic card. 2 — parameter inversion (PI), which is defined on the interval 2—40 msec. 3 — parameter changes integrated map currents (ICT) characterizing changes in the structure (the values of vectors; directions of vectors; spatial distribution within the boundaries of the field measurements) distribution maps of vector current density during msec (on P wave in this case). 4 — parameter integral of the minimum magnetic field (PIMF).

Key words: Magnetocardiography, P wave, chronic obstructive pulmonary disease, paroxysmal form of atrial fibrillation.

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### **CAPABILITIES OF THE ECG DISPERSION MAPPING IN EVALUATION OF MYOCARDIAL LESIONS IN PRATIENIT WITH CARDIOVASCULAR DISEASES AND ALCOHOL CONSUMPTION**

L.A. Varekha<sup>1</sup>, V.E. Dvornikov<sup>1</sup>, P.P. Ogurtsov<sup>1</sup>, G. Halaby<sup>1</sup>, Y.V. Mikheeva<sup>1</sup>, G.G. Ivanov

Diseases of the cardiovascular system continues to be the leading cause of mortality in the Russian Federation. It is known that alcohol contributes a role in the risk of developing cardiovascular diseases. In this study the affect of different doses of alcohol on the course of cardiovascular disease was evaluated using the method of ECG dispersion mapping. The study found the more pronounced changes in the electrophysiological properties of the myocardium in patients with diseases of the cardiovascular system, consuming 5 and more doses of alcohol per day compared with moderate drinking or denies the use of alcohol by patients.

Key words: ECG dispersion mapping, changes in the electrophysiological properties of the myocardium, alcohol, cardiovascular diseases.

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### **THE METHOD OF DISPERSION MAPPING IN ESTIMATION OF DAILY END ANNUAL FLUCTUATIONS MICROALTERNANCE ECG-SIGNAL**

G.G. Ivanov, V.E. Dvornicov, YU.V. Miheeva, N.A. Cuiko, G. Halabi, H. Azaraksh, L.A. Aeyhenvald

The study daily and seasonal rhythm of the factors the analysis variance EKG opens the new possibilities for not invasive study of the processes on cardiometabolic level to organizations of the alive system. The material for the first time introduce in publications on monitoring factors dispersion mapping of ECG-signal. The most important result of the study was a discovery daily and seasonal rhythm of the factors DM ECG beside sound persons.

Key words: dispersion mapping, ECG-signal, day allowance and seasonal biological rhythms, monitoring microalternans.

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### **DAYLY PROFILE MICROALTERNATIONS OF ECG[SIGNALS ACCORDING TO DISPERSION MAPPING**

G.G. Ivanov, E.Yu. Bersenev, V.E. Dvornikov, A.H. Asaraksh, N.A. Chujko, L.A. Eihenvald, A.A. Pecherskikh

This report presents preliminary results of the analysis of the circadian monitoring factors of dispersion mapping (DM). Analyzed daily ECG monitoring in healthy individuals in a free life activity (I group), the data obtained during the research program "Mars-500" in 6 healthy men (2 group), in patients with hypertension (3 group) and IHD with episode of ventricular arrhythmia I-II class on Launu (4 group). For analysis areas by duration in 15—20 minutes from each hour «were cut". Study of the circadian factors of ECG-signal microalternations is a new diagnostic approach to the analysis of electrophysiological status and diagnostic test of the revealing of the myocardium lesions. DM method can be used to obtain new data on electrophysiological features of the myocardium during the day and the diagnosis of myocardium electrical heterogeneity.

Key words: ECG dispersive mapping, early diagnosis of myocardium disease, microalternations of ECG signal.

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### **ESTIMATION DAMAGING ACTIONS RADIOFREQUENCY ABLATION. FOR USING MIKROALTERNACIY ECG-SIGNAL**

N.A.Chuiko, V.E.Dvornicov, YU.V.Miheeva, G.Halabi, N.Azaraksh, L.A.VARIOHA  
G.G. Ivanov, S.P.Leschinski

Radiofrequency current possesses significant damaging effect on myocardium, degree which back proportional age and mass of the body of the patient. The degree of the damage myocardium is in consequence of influence different factor possible to value with use biochemical marker damages of the myocardium, EHO tt all. Explored damaging action of radiofrequency ablation analysis data of variance ECG-signal. Material is for the first time presented in publications on monitoring parameters of dispersion mapping ECG. The most important result of the study was a discovery different variant both raw data and dynamic of the factors ECG-signals.

Key words: dispersion mapping, ECG-signal, monitoring microalternans, atrial fibrillation; radiofrequency ablation

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### **EFFICACY OF CARDIOSYNCHRONIZED ELECTRICAL STIMULATION IN PATIENTS WITH ACUTE HEART FAILURE**

**G.G. Ivanov, M.Yu. Orkvasov, V.E. Dvornikov, H. Azaraksh, N.A. Chuiko, G. Halabi, A. Muraud**

Objective: to study the efficacy of external cardiosynchronized muscular counterpulsation (CMC) in patients with different variants of acute heart failure. The study included the examination results of 62 patients with acute heart failure, which undergo two variants (two groups) of therapy: 1) only the standard drug therapy (diuretics, nitrates, *etc.*) and 2) in the case of its inefficacy over 12 hours, combination of the drug therapy with the CMC sessions over 7 days. The clinical assessment of the patients under examination characterized the group with the standard therapy as less severe. In 64% of the group 2 patients, a significant improvement in the form of improvement in the fluid balance indices was noted during the combined therapy.

Key words: external cardiosynchronized muscular counter pulsation, acute heart failure, ECG-dispersion mapping, predictors of death.

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### **SUCCESS OF CLINICAL APPLICATION OF A METHOD DISPERSIVE MAPPING**

G.G. Ivanov, M.R. Alexandrova, V.E. Dvornikov, G. Halaby, A.H. Azaraksh,

The article includes a brief description of the new method in the electrocardiographic diagnostics — Dispersion Mapping, and the main results of clinical studies. The method finds now the increasing application in clinical practice. The general theoretical prerequisites and methodological aspects of application of the method were considered and the basic principles of analysis were proposed. The results of our original studies were stated. The data on diagnostic and prognostic meaning of the dispersion mapping in health groups and group of patients with different forms of the Coronary Heart Disease were heavily emphasized. Some distant outcomes of the acute coronary syndrome and results of other recent clinical studies were considered.

Key words: dispersive mapping of ECG, screening, early diagnostics of myocardium disease, microalternation of the ECG.

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### **THE USE OF ECG HIGH RESOLUTION AND HEART RATE VARIABILITY METHODS IN DIAGNOSING MYOCARDIAL ELECTRICAL INSTABILITY AMONG ACUTE CORONARY SYNDROME PATIENTS**

**A MAHA, A. ALGAILY, V.E. DVORNIKOV, M.R. ALEKSANDROVA, S.YU. KUZNETSOVA, E.V. AGAFOSHINA, G.G. IVANOV**

Work is devoted to research dynamics of parameters ECG high resolution and heart rate variability methods among patients with acute coronary syndrome in determining myocardial electrical instability and disease trend the carried out. The researches have shown that, the HRECG

and HRV variables in acute coronary syndrome patients have various possible changes, which correlate with the severity of the current disease.

Key words: Electric instability of a myocardium, ECG high resolution, heart rate variability methods

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Key words: ECG dispersion mapping, changes in the electrophysiological properties of the myocardium, alcohol, cardiovascular disease, remote forecast

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## **Analysis Of Circadian Micro Alternations in ECG Using Dispersion Mapping**

G Halabi, G Ivanov Peoples Friendship University Moscow

This research aims to evaluate daily ECG recordings of healthy subjects and that of patients with hypertension and coronary artery disease using dispersion-mapping (DM), a new technology that allows the quantitative evaluation of the energy and metabolic processes in the myocardium at the cellular level while taking into account the circadian fluctuations of metabolic processes.

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## **DIAGNOSTIC OPPORTUNITIES OF DISPERSION MAPPING IN ESTIMATION OF INFRINGEMENT CORONARY BLOODFLOW AND ELECTROPHYSIOLOGICAL PROPERTIES OF MYOCARDIUM AT PATIENTS WITH CORONARY ARTERY DISEASE**

Ahmed Elgaili Ahmed Omdurman. V.E. Dvornikov, M.R. Aleksandrova, S.Yu. Kuznetsova, G.G. Ivanov

Dispersive mapping is a new method of the diagnostic electrocardiogram. In the basis of this method is the analysis of low amplitude fluctuations of ECG-signal, existing in norm and

pathology. Results of the lead researches have allowed to designate a range of changes the parameters of a dispersion for healthy persons at loading and patients with ACS.

Key words: dispersion mapping method, coronary artery diseases.

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**Seasonal changes in the functional state of the myocardium in patients with cardiovascular pathology in Lebanon**

Ghazi Halabi; GG Ivanov; S.M.Chibisov

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**Use of a method dispersive mapping at carrying out of the treadmill-test in patients with IHD**

G.G. IVANOV , E.V. AGAFOSHINA, Gh.HALABI

Work is dedicated to complex study of the factors ECG-12 abductions and altrnance electrophysiology factors of myocardium as of method dispersion mapping ECG when undertaking treadmill-testing in group with IHD. Received results testing are divided into 2 groups: with normal reaction of urgent metabolic adaptation and with broken. Values of relations of  $HR_{max} / IMM_{max} < 3,5$ ;  $\Delta HR_{max-min} / \Delta IMM_{max-min} < 2,0$  (an index of frequency - metabolic adaptation) and size of an index of microalternations  $> 30\%$  of a myocardium on pique HR, characterize group of patients with the broken reaction of metabolic adaptation at carrying out of the treadmill-test at patients IHD without attributes of chronic intimate insufficiency

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**Indexes of ECG microalternation in patients with cardiovascular disease during tensor sample**

G.G. Ivanov

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**EXPERIENCE WITH DEVICE CARDIOVISOR IN CARDIOLOGICAL CARE**

G.V. Ryabykina, A.S. Sula, E.V. Shchedrina

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**Assessing the prevalence of cardiovascular and general pathology by screening examination of the population of Sudan  
According to the dispersion mapping**

Dissertation for the degree  
Candidate of Medical Sciences

AHMED ELGAIL AHMED

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**The study of diagnostic opportunities of a method dispersive mapping in an estimation of infringement of a coronary blood-groove and electrophysiological properties of a myocardium at patients with ischemic heart disease**

Thesis abstract

To obtain a PH D degree in medicine

Saleh Mahmoud Sbeitan

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