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ABSTRACTS

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POSSIBILITIES OF RHYTHMOCARDIOGRAPHY FOR DIAGNOSIS OF CARDIAC ARRHYTHMIAS

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Presented here an experience of using a relatively new method of a diagnosis of cardiac arrhythmias (CA) - rhythmocardiography (RCG) with a correlative and spectral analysis of sinus heart rhythm (HR) wave structure. The following RCG indices were evaluated at rest (Ph) and directive stimulant tests Valsalva, Ashner,active orthostatic,physical exercise(Vm, Pa, Aop, PL):average RR, dispersion of HR waves with high, middle, low frequencies (σs, σm, σl), as a signs of vagal, sympathetic and humoral influences on HR, and their spectral interaction (σs%, σm%, σl%),also meanings of maximal reaction (ΔRR), its time (tAB), restorative time (tr) at tests. For RCG investigations was created an apparatus-program complex "Micor". One of distinctions of RCG is a construction of rhythmocardiogram (RCGm) on a screen. RCGm is a successive row of parts of rectilinear pieces,equivalent in length to pauses between systoles. The duration of these pauses depends on regulative factors, forming HR waves of different frequencies- less 0.03, 0.03-0.12, 0.012-0.28 Hz and more. 964 pts with CA were investigated. RCG data were verified by ECG, EchoCG, Holter monitoring data. RCG was very suitable for registration of CA clinical forms.A number of them has the certain characteristics on RCGm. It may be possible to differentiate an auricular and ventricular extrasystoles (170 and 521 pts). Sick sinus syndrome(SSS) and atrial fibrillation had the certain forms (46 and 48 pts). RCG allows to evaluate a background of CA. An infringement of a coronary circulation was represented by HR stabilization (low meanings of σs, σm), low reaction on Aop (ΔRR), significant HR stabilization during physical exercise in PL. Maximal frequency of CA was in Aop and PL. CA connection with myocardial breach was on the background of increase tAB in Aop, PL, significant prolongation tr after load. An ectopic activity was increased at weakening of the sinus node in Vm, Pa. Sinoatrial blockade, as SSS, had the obligatory signs - bradycardia(high RR) and HR stabilization, as symptoms of oppression of autonomic influence on HR (low σs,σs%, σm, σm%). An electrical myocardial unstability was showed by a supercompensative interval after extrasystole on the sympathetic HR wave. Vasovagal syncopes were registered by an increase RR and simultaneous decrease of blood pressure, corresponding to low σm on RCGm. Tachycardia, significant lowering of all RCG indices, except σl, σl%, and an absence of any HR reactions on stimulus corresponded to an autonomic cardioneuropathy and high risk of a lethal outcome. RCG was useful for definition of extra- and intracardiac influences on CA frequency (245,446 pts), for selection of a drugs with autonomic synaptic activity, control of its efficacy. Thus, RCG was useful for definition of CA form, their background, extracardiac influences, selection and control of pharmacotherapy.

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THE DIAGNOSTIC VALUE OF SIGNAL AVERAGING ELECTROCARDIOGRAPHY IN AORTIC STENOSIS

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Signal averaged electrocardiography (SAECG) has been found useful as an ancillary diagnostic tool for various cardiovascular disorders, especially those conditions which can cause left ventricular hypertrophy, ventricular tachyarrhythmias (VT), syncope and sudden death. We are trying to find the potential usefulness of SAECG in the management of aortic stenosis (AS) as a prototype disease in this category.

METHODS: Signal averaged electrocardiography was performed on 17 patients aged 12 to 73 (mean 45 years) with moderate to severe pure valvular aortic stenosis without history of hypertension or aortic valve surgery. Five patients were female. Standard time domain techniques were applied. In addition to the standard echocardiographic procedure, various parameters were measured for the calculation of aortic valve surface area using continuity equation and left ventricular mass using Penn methods. All high-risk patients were referred for coronary angiography; those patients with significant coronary disease were excluded from the study.

RESULTS: Nine of the patients had positive late potentials (mean 0.53, 95% confidence interval 0.29 to 0.77). No significant difference in age or sex was found between the positive and negative groups. Those patients with positive late potentials had a mean left ventricular mass of 338 g vs. 242 g in the negative group ($p<0.05$). There was no significant difference in the aortic valve gradient and surface area between the two groups. Regression analysis of the data showed a correlation between signal averaged index (SAI; defined as ln(QRSD) + ln(BELOW40) - ln(RMS40)) with mass ($MASS(g) = 105 * SAI^{0.61}$; $r=0.59$).

CONCLUSIONS: These results shows that the correlation between left ventricular mass and late potentials which has been shown for the systemic hypertension and hypertrophic obstructive cardiomyopathy can be also applied to aortic stenosis. It is postulated that SAECG might be useful in predicting the risk of VT and sudden death in aortic stenosis and can be used to stratify the patients into low and high-risk groups.

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LESIONS OF AORTICOPULMONARY PARAGANGLIA RELATED TO SUDDEN DEATH: HISTOPATHOLOGIC CONSIDERATIONS.

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Studies on the pathologic characteristics of the extrinsic nervous system of the heart are scarce in the literature. Although preservation of barochemoreflex responsiveness is an important determinant of the autonomic control of the heart, only a few investigators have paid attention to the possible role of the Aorticopulmonary Paraganglia (APP) in the pathological process involving cardiorespiratory disturbances.

One of the authors (LR) described a patient with mediastinal invasion caused by bronchogenic carcinoma whose cause of death was refractory paroxysms of ventricular tachycardia/fibrillation. Besides, he described a case of mediastinitis with focal inflammation of the mediastinal nerve plexus and paraganglia, observed in acute myocardial infarction associated with sudden death from tachycardia/fibrillation. We have studied the APP of patients died from chronic chagasic cardiomyopathy with marked disturbances of the rhythm. The paraganglia, from all cases studied, showed marked inflammatory changes characterized by mononuclear infiltrate, interstitial fibrosis, and capillary microthrombi in the lobular structures, associated with decreased chief cell granules and proliferation of Schwann-type sustentacular cells. All patients died suddenly after an episode of ventricular tachyarrhythmia degenerating in ventricular fibrillation. Finally, we also described APP hyperplasia, well defined by morphometric parameters, in 23,8% of SIDS (sudden infant death syndrome) victims, when compared with age-matched controls.

These newly detected APP abnormalities seem to add weight to considerations in the pathogenesis of sudden death, because they are suitable to compromise the barochemoreceptor reflex arc, which is of paramount importance in functional cardiocirculatory regulation. Taken together, these results suggest that APP histopathologic alterations could explain or contribute to the pathogenesis of the critical manifestations held to end up in malignant cardiac arrhythmia, namely sudden death.

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THE RISK FACTORS FOR SYNCOPAL CONDITIONS DEVELOPMENT IN CHILDREN WITH VENTRICULAR TACHYCARDIAS

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This study's **objective** was the evaluation of the risk factors for development of syncopal states in children with ventricular tachycardia.

Methods. In 29patients (12 female and 17 male) at the age of 2-14 (mean age 9±5,3) with different forms of non-paroxysmal ventricular tachycardia we carried out the following: standard ECG, echocardiography, Holter monitoring (HM) (Oxford Medilog-Optima) with heart rate variability estimation, signal-averaged ECG. Also we used clinical genealogical method. All patients had been observed before antiarrhythmic therapy was started.

Results. Polymorphous ventricular tachycardia (VT) was diagnosed in 20 children (of them 6 had syncope and 10—pre-syncopal episodes); monomorphous VT was diagnosed in 9 children (3 had syncope). In families of 7 patients heart rate abnormalities and sudden death had been previously met (5 of these patients had polymorphous VT and 2—monomorphous VT). Echocardiography showed right ventricle's cavity enlarged in 3 patients; left ventricular ejection fraction was decreased in 7 patients. According to HM, rigid sinus bradyarrhythmia episodes occurred during the night time in 48% children; T-alteration during the night—in 41%; asystolic episodes of >2,2 s—in 35%; QT-interval prolongation >460 ms—in 28%. Signal-averaged ECG showed the late ventricular potentials in 75% of patients with polymorphous VT and in 36% with monomorphous VT.

Conclusion. QT-prolongation >460 ms (according to 24-hour HM) combined with late ventricular potentials point at high probability of syncope in patients with polymorphous VT. In patients with monomorphous VT syncope should be expected if night rigid bradycardia, asystolia >2,2 s, late ventricular potentials and ejection fraction <0,50 are all present.