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EVALUATION OF THE INFLUENCE OF AUTONOMIC REGULATION ON THE CARDIAC ACTIVITY IN THIREOTOXIC CARDIOMYOPATHY

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**Actuality.** Thyrotoxic cardiomyopathy (Thyrotoxic heart - TH) is a sufficiently common chronic disease in the metabolic endocrine cardiomyopathy group, which remains an important problem in modern cardiology. TH becomes the leading syndrome of hyperfunctional Thyroid diseases with the formation of violations of heart rhythm, arterial hypertension, heart failure, etc. Thyrotoxic cardiomyopathy develops mainly in young, workable patients with thyrotoxicosis, and often does not acquire complete reverse development with elimination of hyperthyroidism, and characterized by chronic, progressive flow.

The use of non-invasive instrumental methods for diagnostics of cardiac pathology (Holter monitoring (HM) ECG and evaluation of heart rate variability (HRV)) allows to objectify and specify the metabolic, hemodynamic disturbances in the TH, as well as to evaluate the effect of autonomic regulation of the cardiac activity to optimize the treatment of these patients. Dynamic applying of these methods of diagnosis of TH may help to assess the effectiveness of treatment, develop criteria for selecting doses of drugs, monitoring of the treatment and rehabilitation of patients with TH.

**The purpose of the study** was to investigate the state of autonomic regulation of the cardiac activity in patients with Thyrotoxic heart in the dynamic observation.

**Materials and methods**. 50 patients with TH manifestations (37 women and 13 men) aged 15-66 years (mean age 40.7 ± 1.5 years) were under observation. The control group consisted of 25 persons without revealed somatic pathology (20 women and 5 men) in the same average age.

HM ECG and evaluation of HRV were conducted in accordance with the recommendations of the experts of the European Cardiology Organization and the North American Society for Cardiac stimulation and electrophysiology (1999) by devise «DiaCard», JSC Solveig (Ukraine), on the beginning of in-patient treatment and on the 10-14th day after admission to the hospital. Time indices of HRV were determined: SDNNi, ms, RMSSD, ms, pNN50,%; spectral - HF, ms2, LF, ms2, VLF, ms2, and LF / HF as an index of balance between sympathetic and parasympathetic regulation. To determine the spectral indices, a nonparametric method of rapid Fourier transformation was used. The statistical indicators were also evaluated: amplitude of mode (AMo,%) and Baevsky index (IB, U).

**Results.** The HRV analysis showed a marked increase in the sympathetic influence on the cardiac activity (an increase in AMo (58.65 ± 1.65%), IB (421.14 ± 28.32 U), a relative increase in LF and VLF-components of spectrum) and decrease of the parasympathetic component (decrease of RMSSD (15.15±0.87 ms), pNN50% (1.71±0.35 ms), HF-component of spectrum (124.25 ± 11.15 m.s2)) against the background of decreasing of the total heart rate variability (SDNNi decrease to 27.37 ± 1.52 ms) and total power of spectrum. The revealed levels of these parameters were significantly different from the control levels (p <0,05).

Multivariate correlation analysis was used to assess the relationship between the obtained HRV indices, anamnestic data (duration of the disease), clinical data (heart rate, systolic blood pressure), and laboratory parameters (T3, T4). It was shown the moderate and strong positive correlation between the levels of T3, T4 and heart rate (r = 0.54), T3, T4 and sympathetic activity (LF, AMO) (r = 0.51 - 0.54), between the level of heart rate and sympathetic activity (LF, AMO) (r = 0.53), a strong positive correlation between the duration of the disease and the sympathetic activity (LF, AMO) (r = 0.53), a strong positive correlation between the level of blood pressure and the indicators of sympathetic activity (LF, AMO) (r = 0.66 - 0.53).

Moderate and severe negative correlation was recorded between the total variability, parasympathetic activity (SDNNi, RMSSD, HF) and the level of T3, T4 in the blood (r = -0.46 - -0.49), and the heart rate (r = -0 , 57 - -0.6). The moderate negative correlation between the duration of the disease and the spectral parameter of parasympathetic activity (HF) (r = -0.45) was estimated also.

Dynamic research revealed significant positive changes in HRV parameters, but the total variability and parasympathetic activity (SDNNi, RMSSD, pNN50%, HF) indicators remained below the norm. Indicators of sympathetic activity (AMO, IB) normalized faster and compared to the control level. Spectral data did not reach the level of control; that was expressed in the reduction of total spectrum power in comparison with control indicators due to reduction of their component content. However, the relative indicator of vegetative balance (LF / HF) became normal (and even lower than the control).

Thus, by complete analysis of the received data, the conducted therapy was assessed as adequate and effective, and was recommended to continue at the post-stationary stage.

**Conclusions.**

1. The following indicators of HRD can be considered as diagnostic criteria of the Thyrotoxic Cardiomyopathy: decrease of the total heart rate variability (SDNNi up to 50 ms), parasympathetic activity (RMSSD <25 ms, pNN50 <5%, HF <550 ms2) and increase of sympathetic component of autonomic regulation of the cardiac activity (VLF>LF>HF, АМо>50 %, ІБ>200 U).

2. Holter monitoring of ECG and evaluation of HRV should be used in the initial diagnosis of TH and also for the monitoring of treatment efficacy in this category of patients.