ARTERIAL HYPERTENSION IN THYROTOXICOSIS AND REMODELING OF THE LEFT VENTRICLE OF THE HEART

Uzokov Jurabek Bakhtiyorovich
Assistant of Samarkand State Medical University
Samarkand State Medical University, Samarkand, Uzbekistan

Abstract *The purpose of the study. The article presents the results of assessing the incidence of arterial hypertension (AH) in thyrotoxicosis (T), its nature, its effect on the nature of left ventricular remodeling (LV) and the prognosis of cardiovascular complications. Results and conclusions. The data obtained demonstrated that hypertension develops with a high frequency and is predominantly systolic in nature. In patients with normal blood pressure, LV hypertrophy (LVH) was exceptionally eccentric. The development of hypertension was accompanied by an increase in the frequency of LVH, mainly due to its concentric version. Concentric LVH, in turn, was associated with the highest incidence of atrial fibrillation and heart failure in the examined patients.*

Keywords: *thyrotoxicosis, systolic arterial hypertension, left ventricular remodeling*

INTRODUCTION

Arterial hypertension (AH) is one of the most common symptoms of thyrotoxicosis (TT). It is traditionally believed that thyrotoxicosis is characterized by an increase in systolic b lood pressure (SAD) with normal or even reduced diastolic blood pressure (DAD), which leads to a significant increase in pulse pressure. An increase in pulse amplitude is a typical consequence of an increase in cardiac output and a decrease in total periph eral resistance (OPS) during TT. Thus, an excess of thyroid hormones can lead to an increase in SAD up to the development of systolic AG. Recent studies have shown that arterial rigidity may increase with TT, despite low OPS. These changes are observed in patients of older age groups,

having reduced elasticity of the arteries due to atherosclerotic changes, they can probably lead to systolic-diastolic hypertension. It is known that the prevalence of systolic hypertension is significantly higher among patients with TT than in euthyroid patients. Even with subclinical TT demonstrated an increase in nighttime SAD and average daily blood pressure. There is a high probability that Hypertension is one of the factors contributingto the development of left ventricular hypertrophy (LVH) in TT. At the same time, the literature analyzed by us provides rather modest information on the severity of hypertension in TT and its effect on the nature of LV remodeling. Accordingly, the purpose of this work

was to study the structure of hypertension in TT and its effect on the nature of LV remodeling and cardiovascular complications of TT.

MATERIALS AND METHODS OF RESEARCH

The study includes a total of 254 patients with Graves' disease TT meeting the following criteria: 1) age 18-55 years; 2) proven TT of Graves' disease at the time

of the first examination; 3) the absence of concomitant diseases of the cardiovascular system that can cause persistent changes in echocardiographic (EchoCG) parameters; 4) consent to participate in the study. 1st examination. At the time of the first examination, the patients were not receiving any therapy. The examination included an assessment of clinical parameters: heart rate (HR), blood pressure level, thyroid hormones (TG) and thyroid-stimulating hormone (TSH), echocardiography. Then, all patients were prescribed mercazolil therapy at a starting dose of 30 mg / day, with its decrease after reaching euthyroidism (on average 3 weeks after the start of treatment) to a maintenance dose of 10-15 mg / day. For the first three weeks, patients received beta-blockers (metoprolol) at an average dose of 100 mg/day. The 2nd examination was conducted one year after the start of treatment against the background of persistent euthyroidism and ongoing therapy and included an assessment of clinical parameters (heart rate, blood pressure), TG and TSH levels, repeated echocardiography.

The examined patients underwent office (during visits) and long-term outpatient blood pressure self-monitoring. Degree of severity AH was established on the basis of WHO recommendations COULD. The levels of free triiodothyronine (T3cv) (norm — 4.0–8.0 pmol/l), free thyroxine (T4cv) (norm — 10-25 pmol/l), TSH

(norm — 0.25–3.5 mMU/ l). The methods of studying the cardiovascular system included: 1) blood pressure assessment, which was determined by a mercury

sphygmomanometer with an accuracy of 2 mm Hg. three times with an interval of 5 minutes, then the average of the last two measurements was calculated; heart

rate was determined by pulse in 60 seconds; 2) Echocardiography. Echocardiography was performed on a Vingmed CFM800 device (GE, USA), a 3.25 MHz sensor in M-modal and two-dimensional mode in standard echocardiography positions. The thickness of the walls and the dimensions of the LV cavity were determined in the parasternal longitudinal section LIE in M-mode. LV myocardial mass (LVMH) was calculated using the formula of R. Devereux and N. Reicheck. All measurements were carried out for at least three cardiac cycles, and then averaged. The study did not include patients with segmental contractility disorders. MMLJ was calculated using the formula: MMLJ = 1.04 × ({TMJP + TZSLJ + KDRLJ}3) — 3) — 13.6 g, where MMLJ is the mass of the myocardium of the left ventricle, 1.04 is the density coefficient of the heart muscle, TMJP is the thickness of the interventricular septum, TSSLJ is the thickness of the posteriorLV walls, LVLC — the final diastolic size of the LV. The left ventricular myocardial mass index (LVMI) was calculated as the ratio MMLJ/PPT, where PPT is the surface area of the body, determined by the formula D. Dubois (LVL values of more than 95 g/m^2 were taken as LVL in women and more than 115 g/m^2 in men, according to the 2005 ASE recommendations). The relative wall thickness (OTC) of LV was determined in the following way: OTC = (TMJP + TZSLJ)/KDRLJ. The values were taken to increase the OTC ≥ 0,42. The classification of G. Ganau 1992 was used to identify the types of LV geometry

(correction of the UAE in 2005), according to which 4 variants of LV remodeling are distinguished: normal LV geometry (NGL) — no LV, OTC < 0.42; eccentric LVH (EGLH)

— there are signs of LVH, OTC < 0.42, concentric LV remodeling (CRLH) — no LVH, OTC ≥ 0.42; concentric LV hypertrophy (LVH) — there is

LVH, OTC ≥ 0.42.

THE RESULTS AND THEIR DISCUSSION

The study included 254 patients with TT Graves' disease at the age of 19 to 55 years (average age 42.4 ± 0.59 years). There were 36 men and 218 women among the surveyed. According to WHO criteria, 91 patients could (36%) normal indicators were recorded Blood pressure (up to 130/70 mmHg), 66 people (26%) had a borderline blood pressure level (130/70–139/89 mmHg),79 patients (31%) had grade 1 hypertension (140/85–159/99 mmHg) and 18 people (7%) had grade 2 hypertension (above 160/100 mmHg). In younger patients For 45 years (n = 129), hypertension occurred in 26% of cases (n = 34) and had a systolic character. In patients 45 years and older (n = 125), hypertension was noted in 55%of cases (n = 69) (p = 0.003), and in 36% of them (n = 25) it was systolic-diastolic. In patients with TT, the incidence of LVH was 22.1% (56 patients), while in women it was

20.2% (44 women), and for men — 33.3% (12 men). Thus, the incidence of LVH

in men was significantly higher than in women [odds ratio (OR) = 3.6; confidence

interval (CI) [1.8; 7.4]; p < 0.05]. At the same time, 46 EGLH was detected in patients (18.2%) and only 10 (3.9%) had KGLH. In 20 patients (8.0%), CRL was noted. The nature of LV geometry influenced the risk of developing such manifestations of thyrotoxic cardiology as atrial fibrillation (AF) and heart failure (HF). In general, in the group of patients with obvious TT, the incidence of AF was 16.5%, and HF was 8.6%. The frequency of AF was maximal in groups with concentric remodeling options LV (LVH — 40% and LVH — 30%), and the lowest was observed in patients with LVH (11.8%, p < 0.01). In the EGLJ group, AF was more common, than in the NGL group (23.9%, p < 0.01), but less often than in the concentric variants (p < 0.01). When analyzing the frequency of HF in the examined groups, it was noted that it did not occur in patients with CRLH, in the group with CRLH, HF was detected in 30% of patients, in the EGLH group — in 15.2% of patientsand in 6.7% of patients with NGLH. The blood pressure level influenced both the risk of developing LVH and its nature, mainly in women. There was a clear relationship between the presence of hypertension and the development of LVH in women. Blood pressure in women without LVH was: SAD = 126 ± 15mmHg, DAD = 75 ± 9 mmHg, and in women with LVH: SAD = 139 ± 15 mmHg, DAD = 81 ± 7 mmHg (in both cases, p < 0.001). In men without LVH, blood pressure was: SAD = 136 ± 14 mmHg, DAD = 79 ± 7mmHg, and in men with LVH: SAD = 142 ± 24 mmHg. At the same time, in the group of patients with normal blood pressure, only EGLH was found, and its frequency was 11%. In the group of patients with borderline blood pressure, the incidence of LVH was 21.2 %,Of these, 19% were for EGLJ and only 2.2% for KGLJ. In the group of patients with hypertension of the 1st degree, the frequency LVH was 22.5%, and KGLH already accounted for 4.5%, and 18% for EGLJ. In the group of patients with hypertension of the 2nd degree, the majority of patients (80%) revealed LVH, while KGLJ accounted for slightly less than half of the cases — 33.3%, EGLJ — 46.7%. Thus, the proportion of people with LVH was the highest in the group of patients

with hypertension of the 2nd degree (33.3%), while the normal geometry of the myocardium in this group was practically not found (6.7%) (x2= 35; p < 0.001).

CONCLUSIONS:

Systolic hypertension is a fairly common symptom of TT, occurring according to our data in a quarter of young patients and half of patients older than 45 years. Appropriate Grade 1 hypertension was diagnosed in 46.4% of patients, and grade 2 hypertension was diagnosed in 5.6% of patients. As in our study, in this study, in individuals with hypertension of thyrotoxic genesis, blood pressure did not reach an increase corresponding to grade 3 hypertension. According to our data, the systolic-diastolic character of hypertension is formed only in older patients (over 45 years old). Development of hypertension in TT, it affects the nature of LV remodeling. In the absence of hypertension, only an eccentric variant of LV develops, and with hypertension, concentric variants of LV remodeling can also form, and their frequency increases significantly as the blood pressure level increases. LVH is considered to be the most unfavorable variant of LV geometry for hypertension for cardiovascular prognosis. The data obtained in our work demonstrate that in TT it is also associated with a worsening of the cardiovascular prognosis. In the examined group, CSF was associated with the highest the frequency of development of AF and HF. Considering that when TT KGLJ is associated on the one hand with the presence of hypertension, on the other hand, with the maximum frequencyof adverse cardiovascular events, adequate correction of hypertension in patients with TT can be considered as an important factor in the prevention of these complications.

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