

## **HYPERTROPHIC CARDIOMYOPATHY IN MULTIMORBIDITY**

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Aspects of diagnosis, difficulties in the diagnosis and optimal therapeutic strategies in patient with hypertrophic cardiomyopathy and comorbid conditions such as arterial hypertension, ischemic heart disease, dyslipidemia, diabetes mellitus type 2, stenosis of the left renal artery, obesity are reviewed on the example of clinical case. Hypertrophic cardiomyopathy combined with multimorbidity conditions requires a high-quality medical management, where the main goal is to improve the quality and duration of patient's life. This goal is being achieved by optimizing patient's lifestyle and assigning only the minimum amount of medications. Necessity of careful diagnosis of hypertrophic cardiomyopathy, evaluation of the risk of sudden death and search of optimal treatment in patients with multimorbidity pathology are demonstrated in clinical case.

**KEY WORDS:** hypertrophic cardiomyopathy, multimorbidity, diagnosis, rational pharmacotherapy, quality of life, disease prevention

## **ГІПЕРТРОФІЧНА КАРДІОМІОПАТІЯ В МУЛЬТИМОРБІДНОСТІ**

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На прикладі клінічного випадку розглядаються аспекти діагностики, складності в постановці діагнозу та оптимальна лікувальна тактика у пацієнта із гіпертрофічною кардіоміопатією та супутніми захворюваннями, такими як артеріальна гіпертензія, ішемічна хвороба серця, дисліпідемія, цукровий діабет 2 типу, стеноз лівої ниркової артерії, ожиріння. Гіпертрофічна кардіоміопатія в сукупності з мультиморбідними станами вимагає якісного медичного менеджменту, в якому головна ціль - підвищення якості та тривалості життя пацієнта досягається оптимізацією способу життя та призначенням мінімуму ефективних лікарських препаратів. Клінічний випадок демонструє необхідність ретельної діагностики гіпертрофічної кардіоміопатії, оцінки ризику раптової смерті та пошуку оптимального лікування при мультиморбідних станах.

**КЛЮЧОВІ СЛОВА:** гіпертрофічна кардіоміопатія, мультиморбідність, діагностика, раціональна фармакотерапія, якість життя, профілактика

## **ГИПЕРТРОФИЧЕСКАЯ КАРДИОМИОПАТИЯ В МУЛЬТИМОРБИДНОСТИ**

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На примере клинического случая рассматриваются аспекты диагностики, сложности в постановке диагноза и оптимальная лечебная тактика у пациента с гипертрофической кардиомиопатией и сопутствующими заболеваниями, такими как артериальная гипертензия, ишемическая болезнь сердца, дислипидемия, сахарный диабет 2 типа, стеноз левой почечной артерии, ожирение. Гипертрофическая кардиомиопатия в совокупности с мультиморбидными состояниями требует качественного медицинского менеджмента, в котором главная цель - повышение качества и продолжительности жизни пациента достигается оптимизацией способа жизни и назначением минимума эффективных лекарственных препаратов. Клинический случай демонстрирует необходимость тщательной диагностики гипертрофической кардиомиопатии, оценки риска внезапной смерти и поиска оптимального лечения при мультиморбидных состояниях.

**КЛЮЧЕВЫЕ СЛОВА:** полиморбидность, полипрагмазия, рациональная фармакотерапия, качество жизни, профилактика

## **INTRODUCTION**

Semi-centennial history of the study of the problem of hypertrophic cardiomyopathy (HCM) reflects the evolution of knowledge in the field of etiology, pathogenesis and clinical course, treatment options of this disease, diagnosis and prognosis.

Hypertrophic cardiomyopathy (HCM) is an autosomal dominant genetic disorder characterized by massive (over 1,5 cm) left ventricular hypertrophy (LVH), and/or in rare cases, the right ventricle, the most commonly observed pattern is asymmetrical thickening of the anterior interventricular septum (IVS). These features can cause dynamic obstruction of the left ventricular outflow tract, diastolic dysfunction, myocardial ischemia, and an increased risk of developing severe, life-threatening supraventricular and ventricular tachyarrhythmia and sudden death [1–2].

Multimorbidity is the combination of multiple chronic or acute diseases and medical conditions in one person. Multimorbidity is the hallmark of an older age, it individualizes clinical picture of HCM, and requires an adequate diagnostic and therapeutic strategies [3–4].

Medical management of such patients with multimorbidity in the cardiology clinic has not been studied enough, which is shown in the given clinical case.

## **CLINICAL CASE**

Male patient, 59 years old, electrician, resident of urban area.

## **COMPLAINTS**

Recurrent headaches of compressive nature in the occipital region, going away after an intake 1 tablet of aspirin within 15 minutes. Fluctuations in blood pressure (BP) measurement at home with a maximum BP 160–170/100 mm Hg; shortness of breath of mixed character, during the walk or excessive physical effort (lift to the 5th floor), disappears within 10 minutes after the rest.

## **ANAMNESIS MORBI**

2004: Arterial hypertension (AH) with a maximum BP 180/100 mmHg. He is constantly taking valsartan 80 mg.

15.02.16: Patient was treated in the outpatient department by administrative district due to the crisis of AH.

18.02.16: He was admitted to the hospital by administrative district for examination and treatment.

In a hospital on an ECG revealed hypertrophy with marked congestion and subendocardial changes on anterior and septum area of LV.

On Echocardiography: severe hypertrophy of IVS, subaortic stenosis?

Diagnosis: Hypertrophic obstructive cardiomyopathy. Secondary arterial hypertension stage II. Mitral valve insufficiency stage I. Atherosclerosis of major cerebral arteries. 1st stage of heart failure, 2nd functional class with preserved systolic function (EF 50 %). Diabetes mellitus type 2, moderate severity. Misc (hypertensive, diabetic) nephropathy.

Drug therapy (Isosorbide dinitrate intravenous, acetylsalicylic acid + magnesium hydroxide, Olmesartan medoxomil, Amlodipine, Bisoprolol, Rosuvastatin) was effective.

22.03.16: Patient was sent to Kharkiv Railway Clinical Hospital № 1 of Brence of «HC» JSC «Ukrzaliznytsia» for the examination and diagnosis verification in the cardiology department.

## **ANAMNESIS VITAE**

Patient has satisfactory living conditions. He eats regularly and varied.

Industrial hazards are being denied.

Patient experiences acute respiratory infections (3–4 times a year), measles.

From 2008 – diabetes mellitus type 2 (takes Metformin 1000 mg). Patient conducts daily measurement of glucose level.

Surgeries: removal of a lipoma in the right scapula (2012).

Patient denies viral hepatitis, tuberculosis, sexually transmitted diseases. Allergic anamnesis is not burdened.

Hereditary history burdened by hypertension on father's side (who died of a stroke at age 61).

## **OBJECTIVE EXAMINATION**

Patient's condition is satisfactory. He is active, but emotionally labile. Height – 162 cm, weight – 82 kg, body mass index (BMI) = 31,2 kg/m<sup>2</sup>. Skin has pale pink

color. Peripheral lymph nodes: submandibular, axillary and inguinal lymph nodes soft consistency, painless, moderately agile and not soldered to each other and the skin. Lobes of the thyroid gland are not palpable; the isthmus is palpated in the form of a uniform cross-strand smooth, 1 cm wide.

There is a mild lung sound above lungs, vesicular breathing in auscultation. Border of the heart expanded to the left. Activity of the heart is rhythmic; heart rate (HR) 75 beats/min. Heart sounds are muffled. Diffuse systolic murmur, with its epicenter in the apex. BP is 150/80 mm/Hg on hypotensive therapy.

Abdomen is enlarged, painless on palpation. Liver sticks out below the rib cage for about 1–1.5 cm, painless.

Pasternatsky's symptom is negative on both sides. Physiological functions: normal. No swelling.

#### **LABORATORY AND INSTRUMENTAL TESTS**

Complete blood count (CBC): figures are in the normal ranges.

Urinalysis: glycosuria (10.9 mmol/l).

Biochemical analysis of blood: high level of glucose (16.24 mmol/l) and glycated hemoglobin (10 %)

Analysis of lipid: increased levels of very low density lipoprotein (1.48 mmol/l), triglyceride level (3.3 mmol/l) and atherogenic index (3.91 mmol/l) – Familial hypertriglyceridemia type IV.

ECG showed sinus rhythm, regular. Heart rate 78 beats/min. Severe left ventricular hypertrophy. Pathologic Q in V1–V3 with ST segment elevation in V3. T-wave inversion in I, aVL, V5, V6.

According to the ultrasound of the heart from 23.02.2016: Severe hypertrophy of the IVS, mitral valve insufficiency of I degree, hypokinesia of IVS, hypertrophic cardiomyopathy, subaortic stenosis. Left ventricular injection fraction – 50 %.

According to the ultrasound of the heart from 23.03.2016: Severe left ventricular hypertrophy, concentric type, sclerotic changes of the aortic wall, fibrosis and calcification of the aortic and mitral valves, signs of increased diastolic stiffness of the left ventricle walls, mitral regurgitation I stage, tricuspid regurgitation I stage. Left ventricular injection fraction – 65 %.

According to the ultrasound of the heart from 30.03.2016: Left ventricular hypertrophy with an asymmetrical thickening of the anterior septal and anterior-lateral segments with mild left ventricular outflow tract obstruction (systolic PGmax=7 mm Hg at rest, systolic PGmax=21 mm Hg at the height of Valsalva's test). Dilatation of left atria. Sclerotic changes of the aortic wall. Pulmonary hypertension (systolic P = 31 mm Hg).

Coronary angiography (CA): right type of coronary blood supply. 80 % extended occlusion of the anterior descending artery and 30 % occlusion of the right coronary artery.

5-hour ECG monitoring by Holter: Rhythm is sinus with an average heart rate during the day 76 beats/min, the maximum is 96 beats/min. Ischemic changes were not detected. Single ventricular and supra-ventricular extrasystoles.

Treadmill test: The test is positive. Tolerance to physical load 10.6 MET. Submaximal heart rate was not achieved. On the ECG recorded ST elevation in leads V4 from baseline to 2.5 mm, V5 from baseline to 2.0 mm, V6 – to 1.5 mm in physical load 10.6 MET. Any cardiac complaints the patient did not show for the entire study period. The recovery period was without features. Completed load corresponds to the I F.C. of angina.

The test with 6-minute walk: The test result complies with functional class II chronic heart failure (distance – 400 m).

Ultrasound of abdominal and retro-abdominal organs: diffuse changes of liver and pancreas parenchyma without magnification. Hepatomegaly. Microcalculus of kidneys. Cysts of both kidneys.

Consultation of ophthalmologist: Angiopathy of the retina of 2 degrees.

Consultation MD., Professor of cardiology and functional diagnostics of KhMAPE: Patient has HCM, obstructive form, hypertrophy of the Antero-septal and Antero-lateral parts of 2-st. Dilatation of the left atrium. Signs of pulmonary hypertension. Arterial hypertensive stage II, 2 degree, very high cardiovascular risk, 1st stage of heart failure, 2nd functional class with preserved systolic function Comorbid conditions: diabetes mellitus type 2, non-compensated.

Given the presence of diabetes, signs of renal arteries shown holding coronary angiography for the assessment of coronary artery.

Recommend tests: Ultrasound of renal arteries with Doppler – Effect, genetic research (Class I evidence) [1], consultation of endocrinologist.

## **DIAGNOSIS**

The underlying disease: Hypertrophic cardiomyopathy with obstruction of the outflow tract of 1 degree, hypertrophy of the Antero-septal and Antero – lateral parts of 2 degree. Dilatation of the left atrium. Pulmonary hypertension 1 degree. Secondary arterial hypertensive stage II, 2 degree, high additional risk. Coronary heart disease: Silent Myocardial Ischemia. Coronary angiography (04.04.16): 80 % occlusion of the anterior descending artery and 30 % occlusion of the right coronary artery. Extrasystolic (supraventricular and ventricular) arrhythmias. Dyslipidemia type IV. Familial hypertriglyceridemia. Insufficiency of the mitral valve of 1 degree. Ila stage of heart failure, 2nd functional class with preserved systolic function (EF=65 %).

Comorbid conditions: Diabetes mellitus type 2, medium- hard course, decompensation. Obesity 1 degree. Chronic kidney disease stage 0. Microurolitiasis. Moderate stenosis of the left renal artery. Cysts of both kidneys.

## **TREATMENT RECEIVED IN HOSPITAL (domiciliary)**

Isosorbide dinitrate – 0.01 % intravenous, Acetylsalicylic acid/ Magnesium hydroxide – 75 mg, Olmesartan medoxomil – 20 mg, Amlodipine – 10 mg, Bisoprolol – 2.5 mg, Rosuvastatin – 10 mg, Metformin – 1000 mg, Glimepirid – 2 mg.

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## **RECOMMENDATIONS**

1. Lifestyle modification: lipid-lowering diet with restriction of refined carbohydrates, increase of the intake of vegetables and fruits, restriction of consumption of table salt, water consumption amounts at the rate of 20 mL/kg in the winter and up to 30 mL/kg in the summer under the control of body weight; limit excessive exercise, allowed fresh air, swimming [5–6].

2. Drug therapy: Nebivolol is 5 mg in the morning (under the control of heart rate and blood pressure), Lisinopril – 10 mg in the evening, Acetylsalicylic acid – 100 mg 1 time per day, Rosuvastatin 10 mg 1 time per day for a long time, Metformin – 1000 mg, Glimepirid – 2 mg [7–12].

## **CONCLUSIONS**

Hypertrophic cardiomyopathy in older age may be associated and combined with other diseases.

In this clinical case, it was combined with arterial hypertension, ischemic heart disease, dyslipidemia, diabetes mellitus, stenosis of the left renal artery, obesity. This combination requires a high-quality of medical management in which the goal of improving the quality and duration of life of the patient is achieved by modification of lifestyle and the minimum medical assignments when polypharmacy is not permitted [13–14].

However, in this clinical case, to confirm the diagnosis of hypertrophic cardiomyopathy, genetic testing is needed.

Thus, the strategy of therapeutic interventions in HCM is complex and involves an individual analysis of the complex of clinical, anamnestic, hemodynamic variables, as well as results of genetic diagnosis, assessment of risk of sudden death, characteristics of the disease, and effectiveness of treatment options.

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