# Medical Expertise

"Development of the European Network in Orphan Cardiovascular Diseases"
„Rozszerzenie Europejskiej Sieci Współpracy ds Sierocych Chorób Kardiologicznych"

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## CASE SUMMARY

The authors present a case of a 51-year-old man with progressive exercise intolerance during the last six months. The patient had been professionally active until the symptoms occurred. Additionally he suffers from a severe spinal column deformation with abnormal protrusion of right shoulder since childhood. The etiology is however unknown.

At the age of 35 he was diagnosed with paroxysmal atrial fibrillation. Cardiac echocardiogram conducted in 1996 showed unspecified, asymmetric hypertrophied LV with preserved global contractility and ejection fraction of 72% and enlargement of the left atrium. In 2008 he was diagnosed with persistent atrial fibrillation and was prescribed oral vitamin K antagonist (acenocumarol), β - blocker (carvedilol), angiotensin - converting enzyme inhibitor (ACE-I, ramipril) and spironolactone.

At current admission he complained of progressive impairment of exercise capacity with concomitant non- characteristic chest pain, occasionally paresthesia especially of the upper extremities. Physical examination revealed irregular heart rate of 80-90/min and normal blood pressure (120/80mm Hg). He did not present any signs of pulmonary congestion or peripheral oedema and did not have neurological defects. He had significant deformation of spinal column and abnormal protrusion of the right shoulder. Basic biochemical parameters, such as blood morphology, liver and kidney function tests, proteinogram and C-reactive protein level (CRP) were normal. NT-proBNP was significantly elevated to 1493 pg/ml. The protrombine index PT-INR was 2,38 (oral anticoagulation).

12- leads ECG revealed atrial fibrillation with HR of 70-80/min, dextrogram, deep S waves in V2-V5 leads, negative T waves in III, aVF.

24 - hour Holter- ECG registered atrial fibrillation with average HR 80/min, without significant ventricular arrhythmias.

Echocardiogram showed significantly dilated atria. Normal sized ventricles. LV with asymmetric, hypertrophied walls ( Spirito index – 3 points, Wigl index – 1point), and moderate impairment of systolic function with the ejection fraction of 45%. Reduced diastolic volume of LV was observed. No left - ventricle outflow tract ( LVOT) obstruction was

present. Global diastolic function of the LV was impaired with elevated LV filling pressure (E/E'-17). Moderate mitral, pulmonary and tricuspid regurgitations were seen.

Spinal column X-ray confirmed severe deformation with dextro-scoliosis of the thoracic segment, sinistro-scoliosis of the lumbo-sacralis segment with axial rotation of the vertebral column and multilevel discopathy

Cardiopulmonary exercise test revealed very low tolerance of physical activity (peak load was 3,5 Mets) with maximal oxygen consumption (VO2max) of 12,33 ml/kg/min which constituted 40% of reference values for age and gender. VE/VCO2 index was significantly elevated (44,95).

Cardiac magnetic resonance imaging (MRI) revealed non-ischemic destruction of the myocardium with numerous intramural and subendocardiali late enhancement areas.

Coronary angiography did not reveal significant stenoses. RHC showed significant impairement of systolic and diastolic function of the LV with highly elevated filling pressure – estimated pulmonary capillary wedge pressure (PCWP) was 20 mmHg. Hemodynamic parameters of pulmonary circulation were within normal limits.

Endomyocardial biopsy from the rightside of intraventricular septum revealed regions of moderate degree hypertrophied cardiomyocytes with demolished structural located especially in subendocardiali area. The biopsy did not confirm any storage or infiltrative disease.

## DISCUSSION

Based on the specific morphological and functional features, cardiomyopathies have been traditionally grouped into four major phenotypes, namely hypetrophic (HCM), dilated (DCM), restrictive (RCM) and arrythmogenic right ventricular cardiomyopathy (ARVC) [1]. Although being clinically useful, such a clear-cut distinction carries inherent flaws and occasionally may be inaccurate. Recent data indicate that substantial proportion of cardiomyopathy patients have in fact more than one phenotype, the phenomenon termed as ***overlap or mixed cardiomyopathy*** [2]. The molecular mechanisms and pathology as well as clinical management and prognosis of overlap cardiomyopathy is largely unknown and speculative.

Clinical diagnosis of HCM requires a finding a hypertrophied, non-dilated LV without evidence of any other cardiac or systemic disease. Maximal wall thickness ≥ 15 mm is classically used as a diagnostic criterion, and hypertrophy is typically asymmetric and involves the anterior ventricular septum [3].

RCM is an uncommon, heterogeneous group of heart muscle disorders that is characterized by an impaired ventricular filling, with normal or even decreased ventricular volumes and preserved ventricular systolic function [1]. Depending on the underlying etiology, ventricular wall thickness may be normal or increased. Atria are usually severely dilated due to increased ventricular resistance. Precise epidemiology of RCM is unknown but true RCM is a rare disease. Majority of RCM are secondary to systemic disorders, such as amyloidosis, sarcoidosis, scleroderma, hemochromatosis, eosinophilic heart disease, or as a result of radiation therapy [4]

The patient has some features of HCM including asymmetric hypertrophy of left ventricle especially intraventricular septum, with maximal thickness of 17 mm, and some features of RCM including dilated atria, impaired ventricular filling and diastole of LV. Cardiac magnetic resonance imaging (MRI) provides some information on possible secondary cause of hypertrophy, based on revelation of late enhancement areas. Although in the case presented above the endomyocardial biopsy of the right ventricle didn't confirm any infiltrative or storage disorders. Notably, left ventricle in end-stage HCM also becomes restrictive.


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## EXPERT'S OPINION

This patients presents features of HCM with prominent diastolic dysfunction. No primary diseases have been found to cause this condition. Therefore, no causative treatment can be applied in this patient. Since the symptoms progresses, and the clinical status of this patient worsens optimization of medical therapy should be advised. Adding diuretics (furosemide or torasemide), escalation of b-lockers and ACEi dosing should be considered. Regular echocardiographic and exercise testing is required to monitor the disease progression. Pulmonary consultation and lung function tests are recommended. Heart transplantation should be considered if the patient's condition deteriorates (especially if VO2/kg max parameter decreases .)[5]

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