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Ventricular hypertrophy: A review

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Abstract
Hypertrophy is called an enlargement of the heart muscle and heart size in response to excessive load caused by pressure or volume or trophic messages (such as hyperthyroidism). The extent of hypertrophy differs according to the underlying cause. Cardiac events from the onset of a beat up to the onset of the next beat are called cardiac cycle. Each heart cycle begins with spontaneous production of a potential for action in the sinusoidal node. This node is located in the upper outer wall of the right atrium and near the peritoneal vein of the corpus and the potential for action is rapidly transmitted from the atria and passes through the ventricular ventricle (AV) to the ventricles. Due to the specific order of the conduction device from the corridors to the ventricles, the cardiac impulse passes from the corridors to the ventricle with more than 0.1 seconds delayed. In this case, the atria will allow the ventricles to contracture and pump blood into the ventricles before the very contraction. Cardiac cycle consists of a rest period called diastole, in which the heart is filled with blood, followed by a period of contraction called systole.

Keywords: ventricular, hypertrophy, review

Introduction

Definition of ventricular hypertrophy

Hypertrophy is called an enlargement of the heart muscle and heart size in response to excessive load caused by pressure or volume or trophic messages (such as hyperthyroidism). The extent of hypertrophy differs according to the underlying cause [1]. The heart weight is 350 to 600 grams (twice the normal weight) during the pulmonary hypertensor and IHD; it weighs 400 to 800 grams (2 to 3 times the Normal weight) in systemic hypertension, aortic stenosis, mitral regurgitation, or dilated cardiomyopathy; finally, it weighs 600 to 1000 grams (3 to 4 times the normal weight) in aortic regurgitation or hypertrophic cardiomyopathy. Hypertrophy is initially a compensatory response that, if it lasts or is severe, can lead to impaired muscle contractility and, ultimately, cardiac insufficiency [2].

Symptoms of ventricular hypertrophy

Left ventricular hypertrophy progresses slowly, and the person in the early stages may not have any signs and symptoms. Symptoms and signs appear as the left ventricular hypertrophy progresses, and the person may develop fatigue, shortness of breath, night-time breathing dyspnea, and signs of runny nose, edema, cyanosis, and tachycardia [3].

Complications of ventricular hypertrophy

Left ventricular hypertrophy is one of the cardiovascular effects of hypertension that increases the risk of cardiac arrhythmias and vascular events in patients with high blood pressure [4].

Causes of ventricular hypertrophy

In addition to hypertension, other factors are also effective in the development of left ventricular hypertrophy. The results of various studies have shown that dyslipidemia, high blood glucose, and the duration of hypertension are factors that affect the left ventricular hypertrophy [5].

Diagnosis of cardiac hypertrophy

In order to detect ventricular hypertrophy, ECG and echocardiography can be used; it must, also, be noted that echocardiography is more sensitive to ECG [6].

Left ventricular hypertrophy symptoms in ECG

Left heart deflection, drop of ST segment with reverse T waves in lateral luminaires, and voltage related currents including: R wave in aVL greater than 12 mm, R wave in line 1 of greater than 15 mm, sum of wave S in line V1 or V2 and R wave in V5 or V6 line greater than 35 mm M are the main symptoms to pay attention to in ECG [7].

ECG manifestations of right ventricular hypertrophy

Long-range R waves on V1 to V3 lines (the R-to-S ratio on the V1 line is greater than 1), the heart-to-right divergence, the normal QRS duration (provided that there is no right-side branch block), deep S waves in lids 1, aVl, V5, V6 [8].

Diagnosis of cardiac hypertrophy in echocardiography

Based on measurements of posterior wall thickness and septal thickness of the heart, it is defined in echocardiography that if the two are more than 9 mm in women and more than 10 mm in men, a person is afflicted with left ventricular hypertrophy [9].

Cardiac cycle

Cardiac events from the onset of a beat up to the onset of the next beat are called cardiac cycle. Each heart cycle begins with spontaneous production of a potential for action in the sinusoidal node. This node is located in the upper outer wall of the right atrium and near the peritoneal vein of the corpus

and the potential for action is rapidly transmitted from the atria and passes through the ventricular ventricle (AV) to the ventricles. Due to the specific order of the conduction device from the corridors to the ventricles, the cardiac impulse passes from the corridors to the ventricle with more than 0.1 seconds delayed. In this case, the atria will allow the ventricles to contracture and pump blood into the ventricles before the very contraction. Thus, the atrial pumps are the basis for the ventricles and the ventricles are the main force necessary for providing blood to the vascular system [10].

Systole and Diastole

Cardiac cycle consists of a rest period called diastole, in which the heart is filled with blood, followed by a period of contraction called systole. Figure 1 shows the different events of a heart cycle on the left side of the heart. The high curve shows pressure changes in the aorta, left ventricle and left atrium. The fourth curve represents ventricular volume changes, the fifth curve of the ectocardiogram and the sixth curve of the phonocardiogram, which records the sounds produced by the heart, especially by the heart valves, during pumping [11].

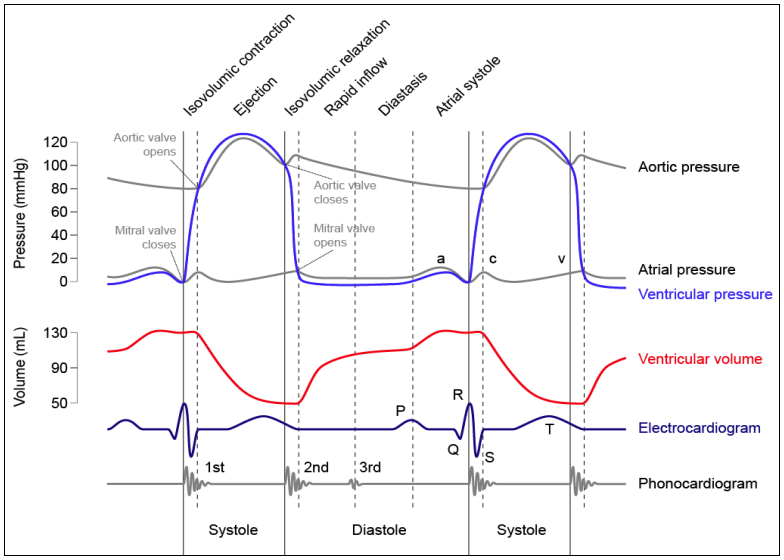

Fig 1: Cardiovascular events on left ventricular function, which show changes in left ventricular pressure, left ventricular pressure, aortic pressure, ventricular volume, electrocardiogram, and phonocardiogram.

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