

DIAGNOSTIC EFFICACY OF ELECTROCARDIOGRAPHY IN DETERMINING LEFT VENTRICULAR HYPERTROPHY IN PATIENTS WITH ESSENTIAL HYPERTENSION

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ABSTRACT

A total of 37 hypertensive patients of both sexes over 18 years of age and more than four years of duration after diagnosis and only those having evidence of left ventricular hypertrophy (LVH) by echocardiography (ECHO) were enrolled to analyze the diagnostic efficacy of electrocardiography in determining left ventricular hypertrophy in patients with essential hypertension. Electrocardiography (ECG) of 37 LVH diagnosed cases were analysed and 31 of them were found to have LVH on voltage criteria. Thus, the sensitivity of ECG in diagnosing LVH is 83%.

Key Words: *Left Ventricular Hypertrophy (LVH), Electrocardiography (ECG), Echocardiography (ECHO).*

INTRODUCTION

Hypertension is blamed to be one of the commonest risk factors in cardiovascular morbidity and mortality. It is such a condition which if not controlled from the very beginning may lead to left ventricular hypertrophy and heart failure. It has become the main cause of heart failure in many developing and developed countries.¹ High mortality is due to left ventricular hypertrophy (LVH). It has been shown by different studies that LVH or increase in left ventricular mass has been the independent risk variable of highest value in cardiovascular morbidity.^{2,3,4} LVH revealed by echocardiography or electrocardiography (ECG) predicts morbidity independent of each other and other cardiovascular risk factors.

LVH revealed by echocardiography and ECG carries different

prognostic information. Therefore, to fully assess the increased risk association with these conditions both ECG and echocardiography should be performed.⁵

This relates to many factors: haemodynamic, individual and trophic, which adversely act upon the heart contractility, perfusion and electrical activity. LVH also leads to four-fold rise in the incidence of lethal ventricular arrhythmias, ischemic cardiomyopathy and acute myocardial infarction. It also constitutes increased probability of sudden death and ten times the frequency of congestive heart failure.^{6,7}

Electrocardiography evidence of LVH is revealed very late and is not so reliable. Echocardiography has specific sensitivity in measuring LVH in essential high blood pressure patients.^{7,8}

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Therefore, Echocardiography appears to be most effective method for delineating LVH.⁹⁻¹²

OBJECTIVE

To analyze the diagnostic efficacy of ECG in determining the left ventricular hypertrophy in patients with essential high blood pressure.

MATERIALS AND METHODS

Hypertensive patients of both sexes and over 18 years of age and more than four years duration after diagnosis and only those having evidence of left ventricular hypertrophy by echocardiography were enrolled for the study. Only verbal consent was taken for enrollment. Hypertension is defined as systolic blood pressure more than 140 mmHg or diastolic blood pressure of more than 90 mmHg or those who were on antihypertensive medications. All cases of secondary hypertension were excluded. Ultrasonography of abdomen and renal artery doppler were done to detect the most common causes of secondary hypertension. Transthoracic echocardiography was performed and septal and posterior wall thicknesses were recorded in m-mode in parasternal long axis. Interventricular septal and posterior wall thickness during end-diastole more than 13 mm was taken as the basic criteria for left ventricular concentric hypertrophy.^{13,14} In fact, this is the commonly practiced day-to-day method in most of the echocardiography laboratories.

Twelve lead ECG were taken adopting the standard procedure and LVH was diagnosed on the basis of the voltage criteria: S in V_1 or $V_2 + R$ in V_5 or $V_6 \geq 35$ mm.¹⁵ Voltage measurements were done manually.

RESULTS

Out of 37 cases enrolled for the study, males were 28 and females were 9. Echocardiography revealed LVH in all 37 cases. ECG revealed left ventricular hypertrophy only in 31

cases (83%).

Out of the echocardiography proven 37 LVH cases, 75% were males and 24% were females; and, out of ECG revealed LVH cases 74% males and 25% females were seen in our series.

DISCUSSION

Before the advent of echocardiography, ECG was used for the measurement of left ventricular hypertrophy on the basis of the voltage criteria. But echocardiography has been proven to be the gold standard for the evaluation of geometry and systolic function.¹⁶ Echocardiography was used as standard method to measure the left ventricular hypertrophy in 100 clear-cut hypertensive patients, which revealed LVH in 93%.¹⁷ Dr. Shanbhag Archana A et al. studied 110 consecutive hypertensive patients of which 64 patients (58.18%) had echocardiography evidence of LVH and 66 (60%) had electrocardiography evidence of LVH. LVH as determined by echocardiography showed positive correlation with that determined by ECG.¹⁸ But many studies refer to echocardiography as a gold standard for measuring LVH. Delgado Vega et. al. concluded echocardiography being the most significant criterion for measuring left ventricular hypertrophy in essential high blood pressure patients.¹⁹

In our series too, out of 37 echocardiography proven LVH cases, ECG revealed LVH in only 31 cases which is 83% only and thus shows a significant difference in positive results.

In the light of reviewed literature and finding of our study, it can be re-emphasized that ECG is not the reliable test for LVH and should be always confirmed by echocardiography.

CONCLUSION

Electrocardiography is not the reliable test for measuring LVH in patients with high blood pressure. It should be always confirmed by Echocardiography.

Table I

	Male	Female	Total
Echocardiography - LVH	28	9	37 (100%)
ECG - LVH	23	8	31 (83%)

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