



TO STUDY THE INFLUENCE OF INSULIN RESISTANCE ON LEFT VENTRICULAR MASS IN HYPERTENSIVE PATIENTS.

Dr. Darshan kumar bhargava

Senior specialist medicine Govt. S.K. Medical College, Sikar.

Dr. Devendra Dadhich*

Principal Specialist medicine Govt. S.K. Medical College, Sikar *Corresponding Author

ABSTRACT

Background:-

Although LVH is generally associated with hypertension, less than half of hypertensive patients develop LVH. Insulin resistance increase endothelial dysfunction due to increase ACE Activities, which decreases arterial compliance. Various studies have shown that LVM is associated with increase level of Blood Pressure and increase SIPG level.

Material & Methods:-

This is a cross sectional study involving 30 patients who had essential hypertension. SIPG level was assessed by RIA method and M mode Echo was performed to assess LVM.

Conclusion:-

A significant positive correlation was observed between post glucose load serum insulin levels and LV mass in hypertensive subjects. This association was found to be statistically highly significant ($p < 0.01$) i.e. it was observed that the higher the post glucose load serum insulin levels the greater was the left ventricular mass.

KEYWORDS :

Introduction:

Hypertension is the presence of a raised blood pressure that places individuals at risk for target organ damage in several vascular beds including the brain, retina, heart and kidneys. It is a common cause of cardiovascular disease and an essential contributor to cardiovascular morbidity & mortality. The majority of patients with hypertension have primary or idiopathic hypertension and only less than 5% have secondary hypertension.

It has been postulated that continuous presence of risk factors such as insulin resistance and hyperinsulinemia, which are unchanged by many antihypertensive drugs, may lead to the cardiovascular events associated with hypertension.

One of the effects of hypertension on the heart is an increase in the left ventricular mass (LVM).

Presence of left ventricular hypertrophy (LVH) as determined by echocardiography to be a powerful risk factor for cardiovascular events. Although left ventricular hypertrophy (LVH) is generally associated with hypertension, less than half of hypertensive patients develop LVH.

LVH has been associated with insulin resistance. Insulin resistance has been shown to partly accelerate cardiovascular complication such as left ventricular hypertrophy and wall thickening of the carotid artery in patients with essential hypertension.

Material & Methods

The study was conducted on patients suffering from essential hypertension attending the medical OPD and various wards.

Inclusion Criteria:

1. Patients of both sexes aged 18 years and above were chosen at random both on an inpatient and outpatient basis.
2. Patients blood pressure measured thrice on two different occasions. The subjects classified as hypertensive if their systolic blood pressure was 140 mmHg or above and/or the diastolic blood pressure was 90 mmHg or greater or those taking antihypertensive medication.
3. After ascertaining that the patient had hypertension, a search for

secondary causes of hypertension was made by taking a detailed history- present, past, family, drug & occupational history, a thorough physical examination and various relevant routine & special investigations.

Exclusion Criteria:

1. Patients with diabetes mellitus, with secondary hypertension (diagnosis of which is assisted by laboratory investigations).
2. Female patients on Oral contraception pills and female patients of pregnancy with hypertension.
3. Patients with valvular heart disease.
4. Patients with pulmonary conditions like bronchial asthma, chronic obstructive pulmonary disease, pulmonary tuberculosis, cor pulmonale etc.
5. Patients with cardiomyopathies.

Observation & Discussion:

TABLE Distribution of left ventricular mass (LVM) And SIPG levels in the study subjects

LVM Gm.	SIPG (micro unit/ml)						TOTAL
	50-79	80-109	110-139	140-169	170-199	200+	
50-99	4	-	-	-	-	-	4
100-149	2	-	2	-	-	-	4
150-199	-	2	3	-	-	-	5
200-249	-	2	6	1	-	-	9
250-299	-	-	4	1	-	1	6
300-349	-	-	-	1	-	1	2
TOTAL	6	4	15	3	-	2	30

Above table shows that in the subjects 30 included in the study, the majority of patients had left ventricular mass and SIPG level between 200-249 gm and SIPG 110—139 Micro unit/ml respectively.

Discussion:-

He study was conducted at the department of Medicine in Govt. S.K. hospital, Sikar.

The objective of the study was to demonstrate a relationship between insulin resistance and left ventricular mass in hypertensive

subjects.

Thirty patients having essential hypertension were included in the study. The subjects included those attending the hypertension speciality clinic, MOPD And admitted in the various wards.

Out of the 30 patients, 20 were males and 10 were females. The patients were 30 to 69 years old. The patients with secondary hypertension coexisting pulmonary diseases, diabetes mellitus, impaired glucose tolerance, valvular heart diseases, cardiomyopathies and women who were pregnant or taking oral contraceptive pills were excluded from the study. All patients were free from cardiac medications and drugs known to interfere with glucose metabolism.

The mean age, height and weight of the subjects in the study were 55 ± 8.8 years, 159 ± 9.48 cm. and 59.2 ± 10.7 kg. respectively.

In the earlier study carried out in our institute it was shown that both the fasting serum insulin levels and post oral glucose load serum insulin levels (SIPG) were higher among the hypertensives (15.72 ± 11.17 and 81.44 ± 36.89) when compared with the normotensives (9.64 ± 3.02 and 17.21 ± 6.70). However the post oral glucose load serum insulin levels were much higher as compared to the fasting serum insulin levels. Thus, SIPG levels are probably a better marker of insulin resistance as compared to fasting insulin levels. The differences between the hypertensives and normotensives were found to be statistically significant.

In our present study we counted the response as the eglycaemic state (normal glucose tolerance) by measuring the fasting and the two hours post glucose blood sugar levels, and estimated the post oral glucose load serum insulin levels (SIPG) as the dose. Thus, in our study SIPG was used as surrogate marker for insulin resistance. The SIPG levels in our study of 30 hypertension subjects ranged from 50.79 to 200 micro unit/ml. The mean SIPG level was 117.08 ± 36.51 micro unit/ml.

We found a strong positive correlation between post glucose load serum insulin levels (SIPG) and the body mass index (BMI). The association was found to be statistically significant ($p < 0.5$).

We also observed a statistically significant positive correlation between the post glucose serum insulin levels (SIPG) and the waist hip ratio (WHR) ($P < 0.5$). The association of BMI and abnormal WHR with insulin resistance which was demonstrated in our study, matched with the previous studies.

The mean values of body mass index (BMI), waist hip ratio (WHR) and post glucose load serum insulin (SIPG) of the patients in our study were 23.45 ± 3.52 , 0.89 ± 0.65 and 117.08 ± 36.51 micro unit/ml. respectively.

In our study, M-mode echocardiography was performed and the left ventricular mass (LVM) was calculated using the formula proposed by Devereaux at al left ventricular mass index (LVMI) was determined by dividing the LVM by the body surface area (BSA).

The left ventricular mass (LVM) and left ventricular mass index (LVMI) in our study subjects ranged from 54.58 to 310.6 g and 44.37 to 181.64 g/m² respectively. The mean values for left ventricular mass (LVM) and left ventricular mass index (LVMI) of the subjects were 195.42 ± 68.81 g and 115.60 ± 38.16 g/m² respectively.

In the 30 subjects included in our study, the majority of the patients had LVM and SIPG levels between 250-299 g and 110-139 micro unit/ml respectively. No significant difference was observed in the LVM and LVMI between the obese and non obese patients probably due to the small number of obese patients.

On calculating the correlation coefficient ('r' value) of post glucose load serum insulin levels (SIPG) with the left ventricular mass (LVM),

a very strong positive correlation was found ($r = + 0.770$). This correlation was found to be statistically highly significant ($p < 0.01$), thus it was observed that the higher the post glucose load serum insulin levels, the greater was the left ventricular mass.

The findings in our study matched with those of other researchers and demonstrated the role of insulin assistance in promoting left ventricular hypertrophy in hypertensive patients.

To summarise, our study highlights the role of hyperinsulinemia (insulin resistance) in promoting left ventricular hypertrophy. Apparently for patients in an insulin resistant state, certain antihypertensive therapies such as mid-high dose diuretics and some beta- adrenergic blocking agents might be inappropriate because these agents can worsen the insulin- resistant state.

The conclusions:-

A strong positive correlation ($r = +0.770$) was obtained between the post glucose load serum insulin levels and the left ventricular mass. This association was found to be statistically highly significant ($p < 0.01$) i.e. it was observed that the higher the post glucose load serum insulin levels the greater was the left ventricular mass. This association between left ventricular mass and post glucose load serum insulin/insulin resistance was demonstrated independently of age, anthropometric measurements and the systolic blood pressure levels.

A strong positive correlation ($r = +0.757$) was obtained between the post glucose load serum insulin levels and the left ventricular mass corrected for body surface area i.e. left ventricular mass index. This association was also statistically highly significant ($p < 0.01$).

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