

## A study on the incidence of micro-albuminurea and left ventricular hypertrophy among hypertensive patients

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### Abstract

**Background:** Hypertension provides both despair and hope. Despair because it is quantitatively the largest risk factor for cardiovascular diseases, is growing in prevalence, and is poorly controlled virtually everywhere. Hope because prevention is possible and because treatment can control hypertension in all most all patients with consequent marked reduction in stroke and heart attack. **Aim of study:** To find out the incidence of micro-albuminuria and left ventricular hypertrophy among hypertensive patients without associated conditions like diabetes mellitus, stroke, ischaemic heart disease and renal diseases. **Materials and methods:** The Study was conducted in 97 cases who are hospitalized in Alluri Sitarama Raju Academy of Medical Sciences from October 2020 to October 2021. after getting approved by the institutional ethical committee. An individual informed consent is taken from all the patients selected for the study. **Discussion:** Left ventricular hypertrophy and microalbuminuria are currently drawing a great deal of attention in the medical literature. Much of this attention derives from the fact that albumin excretion is a risk factor for kidney failure, stroke, and cardiovascular and all cause mortality, particularly for persons with hypertension. **Conclusion:** In our study 22.7 % of the study subjects had microalbuminuria and 20.6 % had left ventricular hypertrophy.

**Keywords:** Hypertension, Microalbuminuria, left ventricular hypertrophy.

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### Introduction

It should be noted that cardiovascular diseases are the leading cause of death worldwide. In turn, hypertension is overall the major contributor to the risks for cardiovascular diseases. The overall worldwide prevalence of hypertension is approximately 26% of the adult population, with marked differences between countries. The increasing prevalence of hypertension is primarily a consequence of the population becoming older and obese. Despite overwhelming evidence that effective treatment of hypertension is associated with a significant reduction of cardiovascular events, the number of patients who are aware of their condition and who achieve adequate BP control remains unacceptably low.

Based on the data from the Heart Outcomes Prevention and Evaluation Study (HOPE STUDY), it is clear that the presence of microalbuminuria is a signal from kidney that cardiovascular risk is increased and that vascular responses are altered. Microalbuminuria is a highly specific predictor of the simultaneous occurrence of both cardiac and vascular abnormalities. Data from the LIFE study show that the ECG strain pattern of ST-segment depression and T-wave inversion in the lateral precordial leads is a predictor of heart failure. This strain pattern has been associated with increased left ventricular mass and depressed left ventricular function

This study is aimed to find out the incidence of micro-albuminuria and left ventricular hypertrophy among hypertensive patients without associated conditions like diabetes mellitus, stroke, ischaemic heart disease and renal diseases.

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### Materials and methods

The Study was conducted in 97 cases who are hospitalized in Alluri Sitarama Raju Academy of Medical Sciences from October 2020 to October 2021, after getting approved by the institutional ethical committee .An individual informed consent is taken from all the patients selected for the study.

### Inclusion criteria

All patients between the age of 35-65 who attend to hospital with hypertension.

### Exclusion criteria

1. Diabetes mellitus.
2. Cerebro-vascular accident.
3. Coronary artery disease.
4. Kidney diseases (creatinine above 2 mg/dl).
5. Urinary tract infection.

### Investigations

Haemoglobin  
Total & Differential count  
Urine Sugar, Albumin & Deposits.  
Blood Sugar(Fasting & Postprandial)

### Serum Creatinine:

Microalbuminuria and urine creatinine:  
Left ventricular hypertrophy by ECG

### Results

#### Age wise distribution

48.5 % of the study subjects were in the age group between 56 and 65 yrs. 37 % of study subjects were between 46 and 55 yrs. Only 14% were younger than 46 yrs.

#### Sex wise distribution

78 % of the study subjects were female and remaining were males

**BMI wise distribution**

As per the WHO classification of obesity the majority (57.8%) of the study subjects were in the BMI (Body Mass Index) between 18.5 and 24.9(healthy weight).34.8% were overweight by BMI. Only minimal study subjects were moderate and severe obese

**Residence wise distribution**

Majority (80.4 %) of selected subjects were from rural area.

**Duration of hypertension and its distribution**

37.1 % were taking treatment for hypertension between one to two yrs. 19 % were taking treatment for 3 to 5 yrs. Only meager were in the category of more than 5 yrs duration.

**Systolic blood pressure and its distribution**

45.4 % of them has SBP reading between 121 to 140 .27.8 % of study had between 141 and 160. Negligible number of study subjects had SBP of more than 160 and less than 120.

**Diastolic blood pressure and its distribution**

75.3 % of study subjects had diastolic blood pressure between 81 and 90.

**Incidence of microalbuminuria**

22.7 % of the study subjects had microalbuminuria

**Incidence of left ventricular hypertrophy**

ECG was taken in all study subjects and it was found that 21 % of the study subjects had left ventricular hypertrophy

**Relation between microalbuminuria and age**

25.5 %of subjects belong to the age group between 56 to 65 yrs. Only 14 % belong to the age group between 35 to 45 yrs. As the age increases the occurrence of microalbuminuria also increases.

**Relation between age and left ventricular hypertrophy**

27 % of the study subjects who had left ventricular hypertrophy belong to the age group between 46 to 55 and 21.7 % belong to age group between 56 and 65. There is no consistent increase in the incidence of left ventricular hypertrophy with age.

**Relation between sex and microalbuminuria**

There is strong correlation between sex and microalbuminuria. The p value was less than 0.01 which signifies a statistical difference between male and female with regard to microalbuminuria

**Relation between sex and left ventricular hypertrophy**

Out of 21 males 6 had left ventricular hypertrophy ,where as it was only 18.4 5 out of 76 females. Regarding the relationship between sex and left ventricular hypertrophy our study showed a very strong statistical difference between sex and left ventricular hypertrophy

**Relation between body mass index and microalbuminuria**

Body mass index has not showed any correlation with microalbuminuria since majority (57.8 %) of the study subjects were with body mass index in healthy weight. Hence there was no statistical significant difference between body mass index and microalbuminuria. Though in general the probability of occurrence of microalbuminuria increases as the body mass index increases.

**Relation between body mass index and left ventricular hypertrophy**

Left ventricular hypertrophy was present only in the subjects who were in healthy weight and overweight. Left ventricular hypertrophy was absent in rest of the subjects. Since majority (57.8 %) of the study subjects as mentioned early were in the healthy weight, the percentage of Positivity for left ventricular hypertrophy was also observed more among them.

**Relation between duration of hypertension and microalbuminuria**

No statistical significance between the duration of hypertension and the occurrence of microalbuminuria.

**Table 1: Relation between systolic blood pressure and microalbuminuria**

There was no statistical significance between systolic blood pressure and the occurrence of microalbuminuria

SBP	NO.OF PERSONS	MAU +	MAU-	% OF POSITIVITY
<120	20	1	19	5
121-140	43	11	32	25.6
141-160	28	8	20	28.6
>160	6	2	4	33.3

**Table 2: Relation between diastolic blood pressure and microalbuminuria**

Our study showed a statistically significant difference between diastolic blood pressure and the occurrence of microalbuminuria. As the diastolic blood pressure increases, the number of percentage of study subjects who were positive for microalbuminuria was also increased

DBP	NO.OF PERSONS	MAU +	MAU-	% OF POSITIVITY
<80	3	0	3	5
81-90	73	16	57	21.9
91-100	21	6	15	28.6
>100	0	0	0	0

**Table 3: Relation between systolic blood pressure and left ventricular hypertrophy**

Out of 20 subjects who had left ventricular hypertrophy, 12 had systolic blood pressure between 121 to 140 and 7 had systolic blood pressure between 140 to 160. By applying chi square test it was not statistically significant.

SBP	NO.OF PERSONS	LVH +	LVH-	% OF POSITIVITY
<120	20	0	20	0
121-140	43	12	31	27.9
141-160	28	7	21	25
>160	6	1	5	16.6

**Table 4: Relation between diastolic blood pressure and left ventricular hypertrophy**

Out of 21 study subjects of diastolic blood pressure between 91 to 100, 23.8 % had left ventricular hypertrophy were as it was only 20.5 % among the study subjects who had diastolic blood pressure between 81 to 90. There was a constant increase in the left ventricular hypertrophy Positivity with the increase in diastolic blood pressure and it was statistically significant

DBP	NO.OFPERSONS	LVH +	LVH-	% OF POSITIVITY
<80	3	0	3	5
81-90	73	15	58	20.5
91-100	21	5	16	23.8
>100	0	0	0	0

### Discussion

Microalbuminuria is defined as low levels of urinary albumin excretion of 30 to 300 mg. Cardiovascular (CV) disease risk increases markedly with increasing amount of albumin in the urine. The predictive power of urinary albumin levels for CV risk is independent of other CV risk factors and not only is present in individual with diabetes and/or hypertension but also in healthy individuals. In conclusion, albuminuria seems to be a sensitive marker very early in life for the susceptibility of an individual to CV disease. It therefore may be an ideal target for early primary prevention using CV-protective therapy regimens. Microalbuminuria is defined as small quantities of albumin in the urine, ranging from 30 to 300 mg/d. Below 30 mg/d (or 20 mg/L) is considered normal, and above 300 mg/d (or 200 g/L) is considered to be macroalbuminuria (also called overt albuminuria). Albuminuria seems to be an independent and strong predictor for CV disease. Several strategies are available to lower urinary albumin excretion in the microalbuminuric range. Widely known is the albuminuria-lowering effect of antihypertensive agents, in particular those that intervene in the renin-angiotensin aldosterone system. However, statins and glucose-aminoglycans also have been proved to lower albuminuria. The more the angiotensin II antagonist losartan lowered albuminuria, the more the patient was cardio protected, irrespective of the effect on other CV risk factors.

Independent of blood pressure, electrocardiographic (ECG) left ventricular hypertrophy (LVH) is also associated with an increased risk of new heart failure. This risk is decreased by the prevention of ECG LVH. Antihypertensive therapy that reduced blood pressure has been shown to decrease ECG LVH, and regression of ECG LVH has been correlated with a significant reduction in cardiovascular death, myocardial infarction (MI), and stroke, regardless of antihypertensive treatment or degree of decrease in blood pressure. An increased left ventricular mass has been amply demonstrated in patients with microalbuminuria.

### Conclusion

In our study 22.7 % of the study subjects had microalbuminuria and 20.6 % had left ventricular hypertrophy. There was a strong statistical association between microalbuminuria and age, sex and diastolic blood pressure. Similarly the statistical association between left ventricular hypertrophy and diastolic blood pressure was strong. Both microalbuminuria and left ventricular hypertrophy were not statistically associated with body mass index and systolic blood pressure

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