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Study of Microalbuminuria in patients with Hypertension

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Abstract

Background: *The prevalence of Hypertension is 29.8% in India and is directly responsible for 57% of all stroke deaths and 24% of all coronary heart disease (CHD) deaths*

Objective: *This study focuses on prevalence of microalbuminuria in hypertension, its correlation with duration and severity of hypertension, and lastly whether microalbuminuria is a useful biomarker for predicting target organ damage.*

Material & Methods: *The study was conducted in MGM Medical College and Hospital Navi Mumbai for a period of 2 years between 2015 to 2017. Patients between 25 – 60 years of age, with at least 3 readings of increased blood pressures or known hypertension were studied extensively. Univariate analysis (chi square test) was used to determine the relationship between MA and other variables, and the results were expressed as p values.*

Results: *The overall prevalence of MA in the study was 49% of which 71% were males. 40.82% of patients with microalbuminuria were between 41 – 50 years of age. There was a strong correlation (p < 0.05) between severity of hypertension and MA as 57.74% patients of Stage-2 JNC-7 classification of hypertension had microalbuminuria.*

Conclusions: *The prevalence of Microalbuminuria, is about 49% among the patients with hypertension. The factors that are positively correlated with microalbuminuria, in the study, are, older age, severity of hypertension.*

Introduction

Hypertension is one of the most influential risk factors for mortality worldwide.[1] The overall prevalence of Hypertension in India is 29.8%[2] Hypertension is directly responsible for 57% of all stroke deaths and 24% of all coronary heart disease (CHD) deaths in India.[3] The classic manifestations of hypertensive end organ damage include the following: vascular and hemorrhagic stroke, retinopathy, coronary heart disease/ myocardial infarction and heart failure, proteinuria and renal failure and in the vasculature, atherosclerotic change including the development of stenosis and aneurysms.[4]

Aims & Objectives

- To Study Prevalence of Microalbuminuria in patients with Hypertension.
- To predict whether Microalbuminuria is a useful Biomarker for Target Organ Damage.

Material & Methods

The study was carried out in patients, either visiting OPD (Outpatient Department) or getting admitted in MGM Hospital, Kamothe, Navi Mumbai, India, between November 2015 to November 2017.

| Inclusion Criteria	Exclusion Criteria :
1. Age group of 25 - 60 years. 2. Male and female 3. Newly detected Hypertensive Patients. 4. Known cases of Hypertension since 5 years with/ without treatment.	1. Overt proteinuria. 2. Congestive cardiac failure. 3. Chronic Renal failure. 4. Urinary tract infections. 5. Diabetes mellitus. 6. Pregnant women. 7. Obstructive uropathy&nephrolithiasis. 8. Renovascular Hypertension 9. Drugs causing Hypertension : Steroids, Amphetamines, NSAIDS

Study Design

The study comprises of 100 patients. Patients fulfilling the study criteria were examined clinically and underwent routine investigations for initial evaluation. Patients were categorized on the basis of JNC-7 classification, severity (Blood pressure on admission) and duration of hypertension. 3 urine samples on 3 separate occasions were sent for Spot UACR. The mean of 3 values of UACR was calculated quantitatively & categorized as UACR positive ($\geq$ 30mg / g) & UACR negative< 30 mg/g). The qualitative result of UACR was then correlated with other parameters. Patients with UACR $\geq$30 mg/g were screened for further end organ damage.

Statistical Analysis

Univariate analysis (chi square test) was used to determine the relationship between Microalbuminuria and other parameters. Results of the study were expressed as p values.

Graph 1 Age Wise Distribution of Patients with Hypertension
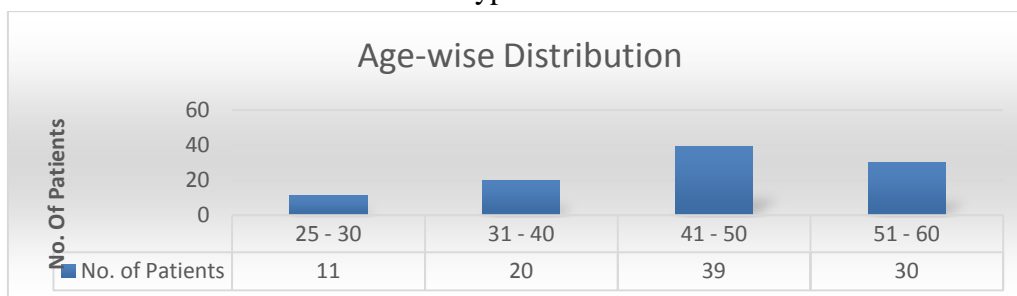
Graph 1 represents, Age-wise Distribution of all hypertensive in this study. It was observed that, 39 patients were between 41 to 50 years of age. 30 patients fell in 51 – 60 years of age group, whereas 11 & 20 patients were present between 25 – 30 years & 31 – 40 years respectively.

Table 1 Duration of Hypertension

	No. of Patients	Positive UACR	Negative UACR
Newly Diagnosed	38	20	18
Recently Diagnosed ($\leq$ 1 year)	36	8	28
1 to 2 years	12	14	2
3 to 5 years	14	7	7

Table 1. Divides the study group on the basis of duration of hypertension. All patients were categorized into 4 groups i.e Newly diagnosed, duration of hypertension $\leq$ 1 year, 1-2 years, 3-5 years respectively. 38 patients were newly diagnosed, 36 were recently (Upto 1 year)

diagnosed & 12, 14 patients had hypertension since 1-2 years and 3-5 years respectively.

Interpretation: Since p-value for the chi-square test and Fisher's test is less than that of 0.05 indicates significance of association between Duration of Hypertension and UACR.

Table 2 Distribution based on Grade of Hypertension (JNC-7)

Grade of Hypertension	SBP mm Hg		DBP < 80 mm Hg	No. Of Patients
Pre-hypertensive	< 120 - 139	Or	< 80	
Stage – 1	140 – 159	Or	90 – 99	29
Stage – 2	≥ 160	Or	≥ 100	71

Table 2 shows that all hypertensives included in this study either belonged to Stage-1 or Stage-2 of JNC-7 classification of Hypertension. 29 patients belonged to Stage 1 & 71 patients belonged to Stage-2 of JNC-7 classification of Hypertension.

Graph 2 Effect of Grade of Hypertension (JNC-7) on UACR
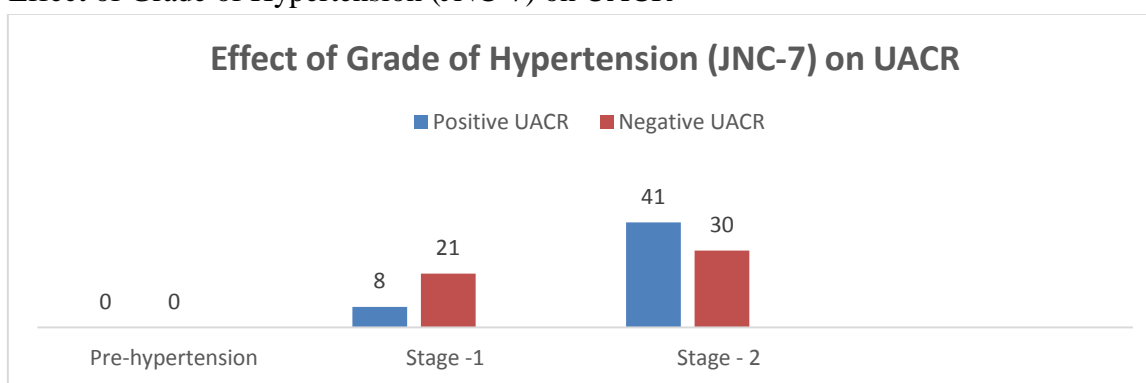
Graph 2 shows that, maximum (41) patients having microalbuminuria belonged to Stage-2 JNC-7 classification of hypertension. Only 8 patients from Stage 1 JNC-7 classification of hypertension had microalbuminuria. Microalbuminuria was absent in prehypertensive patients.

Interpretation: Since p-value for the chi-square test and Fisher's test is less than that of 0.05 indicates significance of association between Grade of Hypertension and UACR. It can be considered that microalbuminuria increases with rising blood pressures.

**Graph 3** Prevalence of Target Organ Damage in Hypertension
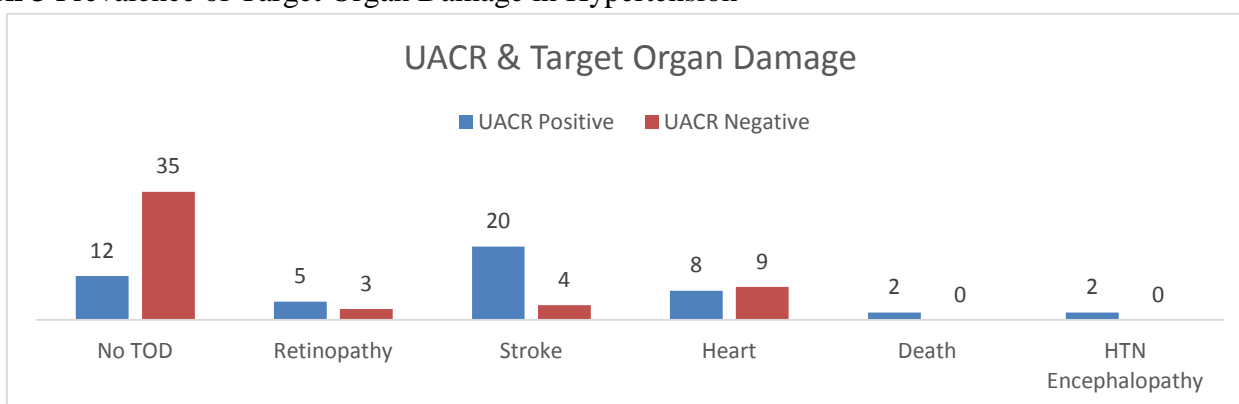
Graph 3 demonstrates the prevalence of microalbuminuria in various hypertensive – target organ damage. 20 Patients with Stroke & 8 patients with cardiac complications had microalbuminuria.

Table 4 Relation between Target organ damage and UACR

Target Organ Damage	Positive	Negative
Yes	37	16
No	12	35

Graph 4 Relation between Target organ damage and UACR
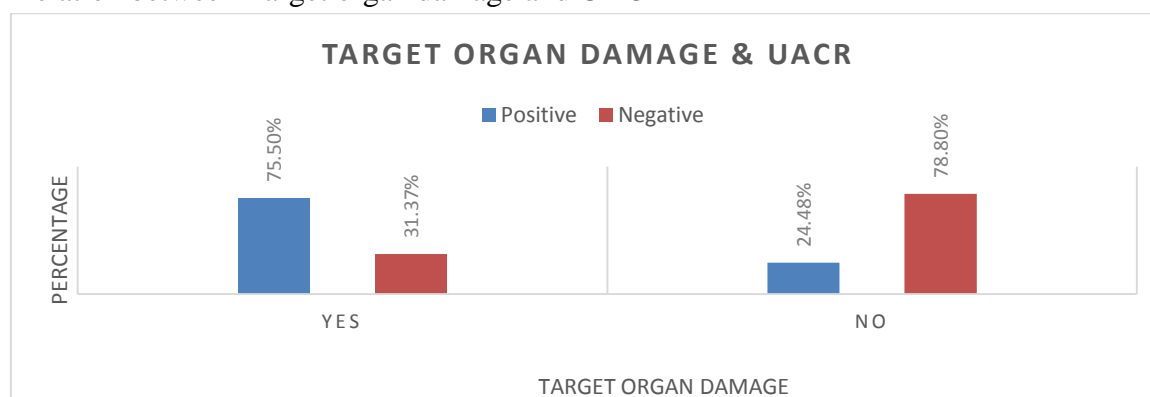
Graph 4 is a graphical representation of table 9 showing 75.50% of cases with target organ damage have microalbuminuria, whereas 78.80% of cases without target organ damage did not have

Interpretation

Since p-value for the chi-square is less than that of 0.05 indicates significance of association between Target organ damage against UACR.ve microalbuminuria

Results

The data has been studied based on, demography, duration of hypertension, grades of hypertension, target organ damage The overall prevalence of Hypertension in India is 29.8%. The overall prevalence of MA in this study was 49% that is higher than the prevalence of MA observed in the (26.67%) study conducted by B. Hitha & JM Pappachan or (23%) in the LIFE study.[5] The study revealed that prevalence of microalbuminuria in hypertensive patients, increased with age. 38 patients in the study population were newly diagnosed, 36 were recently (Upto 1 year) diagnosed whereas 16 patients had history of hypertension since 1 – 2 years & 14 patients were hypertensive since 3 – 5 years. Based on JNC-7 classification of hypertension, patients included in this study either belonged to Stage-1 (29) or

Stage-2 (71) of JNC-7 classification of Hypertension. 57.74% patients of Stage-2 JNC-7 classification of hypertension had microalbuminuria indicating significant association between Grade of Hypertension and UACR, since p-value for the chi-square test and Fisher's test was less than that of 0.05. It was observed that taking anti-hypertensive medication, reduces microalbuminuria (p= < 0.05). 68.8% of patients with end organ damage had microalbuminuria, there was a significant association between end organ damage.

Conclusion

The study concluded that the factors that are positively correlated with microalbuminuria, are severity of hypertension, Regular treatment with anti- hypertensive medications tends to reduce the prevalence of microalbuminuria.

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