



CORRELATION OF MICROALBUMINURIA WITH TARGET ORGAN DAMAGE IN NEWLY DIAGNOSED HYPERTENSIVE PATIENTS

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ABSTRACT Hypertension is one of the commonest diagnosis in hospital /out patients in our country with a significant morbidity and mortality. Microalbuminuria has important cardiovascular implications in hypertensives. Microalbuminuria is an independent risk factor for target organ damage and the severity of the disease and considered as an important prognostic indicator. This study aimed at determining the relationship between microalbuminuria and age of the patient, level of blood pressure and target organ damage. One hundred hypertensive cases were evaluated for microalbuminuria and left ventricular hypertrophy and retinopathy. Significant microalbuminuria was found to occur in hypertensive patients. The odds ratio for microalbuminuria patients having retinopathy was 12(95% CI = 2.5927 to 55.5403). A significant correlation is seen between the prevalence of microalbuminuria and the presence of LVH ($p < 0.05$) in hypertensives. This study suggests that there is a positive correlation between microalbuminuria and target organ damage in hypertensive patients, calls for further studies with greater sample size.

KEYWORDS : Hypertension, Microalbuminuria; Target organ damage.

INTRODUCTION

Hypertension is a major public health problem all over the world. Hypertension is estimated to cause 7.5 million deaths, about 12.8% of the total of all deaths. This accounts for 57 million disability adjusted life years (DALYS) or 3.7% of total DALYS. Blood pressure levels have been shown to be positively and continuously related to the risk for stroke and coronary heart disease. Target organ damage resulting from Hypertension includes those affecting the brain, heart, kidneys and the eyes². Treating systolic blood pressure and diastolic blood pressure until they are less than 140/90 mmHg is associated with a reduction in cardiovascular complications.

Essential hypertension produces clinical proteinuria and a significant reduction in renal function in 5 – 15% of patients. The advent of more sensitive methods to quantitate the urinary albumin excretion (UAE) has revealed higher frequency (25-100%) of microalbuminuria in patients with hypertension than in normotensive population. This wide variability in the incidence of micro-albuminuria in these studies may be related to the severity and control of hypertension, selection criteria, racial differences etc. Microalbuminuria possibly reflects a state of increased renal endothelial permeability and is an easily measured marker of rather diffuse endothelial dysfunction, low grade inflammation and vascular disease burden. Microalbuminuria can be diagnosed on the basis of three positive tests - Albumin creatinine ratio; urine albumin excretion rate or a combination of both. 24 hour urine albumin excretion remains the gold standard, but impractical for routine practice. Therefore, screening for microalbuminuria and follow up of patients is now a general practice in some countries, but not all. Although the determination is yet to be fully standardized, current assessment methods are sufficiently robust to warrant periodic assessment for all hypertension patients.

AIM

To correlate microalbuminuria with target organ involvement in newly diagnosed hypertensives

OBJECTIVES

1. To observe microalbuminuria in newly diagnosed hypertensives
2. To study the relationship between microalbuminuria and age of the patient, level of blood pressure, and other coronary risk

factors.

3. To find correlation if any between the level of BP and microalbuminuria
4. To study the correlation between microalbuminuria and target organ damage

MATERIALS AND METHODS

The study was performed in the Department of General Medicine, MAHARAJAH'S INSTITUTE OF MEDICAL SCIENCES, Nellimarla, Vizianagaram. Study was done after obtaining written consent from the patient and taking institutional ethical committee approval

Study Period: Approximately 1 year (December 2016-December 2017)

Sample size: 100 patients

Inclusion criteria:

1. Patients with age more than 20 years
2. Patients who are newly diagnosed hypertensives, with systolic BP ≥ 140 mm Hg and/or diastolic BP ≥ 90 mm Hg in at least 3 visits.

Exclusion criteria:

1. Patients with age < 20 years of age
2. Patients with Diabetes Mellitus, Albuminuria
3. Patients with renal diseases or raised serum creatinine [> 1.5 mg/dl]
4. Patients with urinary tract infection.
5. Patients with a history of Ischemic Heart disease

RESULTS

Of 100 patients 23.4% (18 out of 68) males and 31.25% (10 out of 32) females showed microalbuminuria ($X^2 = 0.2466$, $P = 0.6195$). The prevalence of microalbuminuria increases with age in hypertensive patients and the difference was statistically significant

Microalbuminuria was more common among those with an unfavourable lipid profile (microalbuminuria 42.11%) with a significant P value of 0.0139.

Microalbuminuria in patients with stage 1 hypertension was 13.33% and in stage 2 hypertension was 38%.Patients with higher level of blood pressure had higher probability of having microalbuminuria with significant P value(0.03).

Microalbuminuria was found to be significantly associated with BMI.Patients. A higher proportion of patients in the over weight group had microalbuminuria compared to normal BMI.

Out of 100 patients 50 patients had changes of hypertensive retinopathy. Of the 50 patients with fundus changes, 20 patients (40%) had microalbuminuria, 30 patients (60%) did not have microalbuminuria Among the remaining 50 patients 38 patients had normal fundus, and in 22 patients fundus was not visualized due to hazy media..

Table – 1 : Fundus Changes And Microalbuminuria

Fundus	Total No.	Microalbuminuria				X ² = 23.67 P = 0.00009
		Absent		Present		
		No.	%	No.	%	
Normal	38	36	94.73	2	5.27	
Grade I	12	10	83.33	2	16.67	
Grade II	18	12	66.67	6	33.33	
Grade III	12	6	50	6	50	
Grade IV	8	2	25	6	75	

Among the patients with evidence of LVH by ECHO, a significantly higher proportion had microalbuminuria. Out of 100 patients 26 patients had left ventricular hypertrophy(LVH).Among patients with LVH 53.85%(14)of them had microalbuminuria. Among patients with out LVH 18.92%(14) have microalbuminuria. Hence microalbuminuria is positively correlated with LVH with P = 0.0024.28 out of 100 patients had microalbuminuria with or without LVH

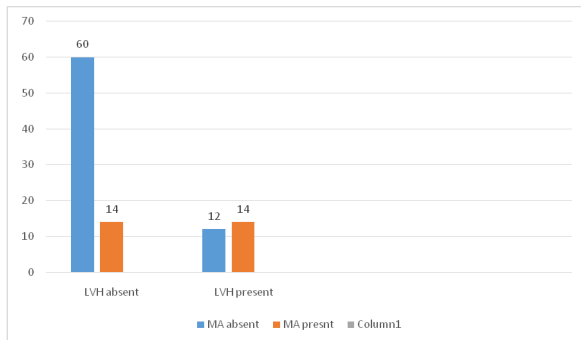


FIGURE 1: LVH and Microalbuminuria

The distribution of microalbuminuria in patients with retinopathy was 20 and in patients with LVH was 14. There is a significant relative risk of developing retinopathy(P value =0.0015)and left ventricular hypertrophy(P value = 0.0011) in patients with microalbuminuria

DISCUSSION

The prevalence of microalbuminuria in this study was 28% compared to Bianchi et al study it was 35%, 35%.in Palatini et al HARVEST study,47%inTsioufis et al study. The variability in prevalence may be explained by different values used to define microalbuminuria. There was no significant difference between prevalence of microalbuminuria in men and women [p= 0.6195] in this study.Similar results are noted in Hitha B et al study (2008)⁴ where as in HUNT study sex and Albumin creatinine Ratio (ACR) was statistically significant (p=0.003).

The prevalence of microalbuminuria was higher in the older age groups as observed in the present study [P = 0.0314].In Hitha B et al study (2008) prevalence of microalbuminuria increased with the age of hypertensives⁴. Microalbuminuria have positive correlation with the severity of Hypertension [P = 0.0033] in this study. Cerasola et al and Ophsal et al studies had similar observations.⁵ In Hitha B et al study (2008)⁴ the prevalence of microalbuminuria was higher in patients with blood pressure >160/100 mm of Hg than in those with SBP 140-159 mm Hg and DBP 90-99 mm Hg (46% vs 8.7%) .Similar positive correlation was noted in i-SEARCH study.⁶

Microalbuminuria had significant correlation with BMI in the present study [P= 0.002]. Leocini et al had observed greater BMI in patients with microalbuminuria (p < 0.04) Similar results were observed in Hitha B et al study (2008)⁴.In the present study prevalence of Microalbuminuria among overweight individuals was 28.6% whereas it was 12.6% in normal weight patients.

In the present study Microalbuminuria was found to be more prevalent in those patients with unfavorable lipid profile (P = 0.0139).This is in agreement with previous studies like Bianchi et al in 1997.In Hitha B et al study(2008)⁴ the prevalence of MA was more among those with unfavourable lipid profile (38.5%) with significant p value of <0.01

The present study showed a significant correlation between microalbuminuria and the presence and severity of retinopathy (P< 0.001).Beisen et al in 1997 has observed an increased prevalence of hypertensive retinopathy in a group with persistent microalbuminuria despite adequate treatment. (P < 0.03). In 2002 Cerasola et al has observed a greater prevalence of Retinopathy among those patients with microalbuminuria. In Hitha B et al study(2008)⁴ prevalence of microalbuminuria in those with hypertensive retinopathy was higher and it increased with the grading of retinopathy (75% among Grade IV retinopathy patients) In Busari O et al study (2011)⁸ patients with microalbuminuria were more likely to have hypertensive retinopathy than those without microalbuminuria (71% vs 37% p value <0.001). significant hypertensive retinopathy(Grade III and IV) was more common in patients with microalbuminuria than those without microalbuminuria. (22.6% vs 1.5%).

Since the number of patients presented with stroke were very less they were not included in the statistical analysis of the present study It is well known that microalbuminuria is a predictor of ischaemic stroke due to its well known association with carotid atherosclerosis.In a study by Pontremoli et al (2002), out of 279 patients studied, Urine albumin excretion was positively associated with carotid atherosclerosis.

In the present study it was observed that there is significant correlation between the prevalence of microalbuminuria and the presence of LVH (P < 0.05). W.Kristian et al in 2002 (LIFE study) observed a higher prevalence of microalbuminuria of 30%(P<0.0001) in hypertensive patients. Similar observations were found in Pontremoli et al (P < 0.001), Stefanadis et al (p<0.0001). In O Busari et al study (2009)⁸ significant correlation is found between the microalbuminuria and left ventricular hypertrophy with p value < 0.002.In B Hitha et al study (2008)⁴ p value is significant and found to be 0.001. In Arnold Forlemu et al study (2013)⁹ observed the prevalence of LVH among patients with microalbuminuria and there was a significant correlation between the microalbuminuria and Left ventricular myocardial infarction with P value <0.001.Juliet Nabbaale et al study (2015)¹⁰ observed a positive correlation between microalbuminuria and LVH among newly diagnosed adult hypertensive patients. (p= 0.003)

CONCLUSION

Hypertension is a major health problem in the world and in every community and majority of the times it is silent and leads to target organ damage.The prevalence of microalbuminuria varies in different populations. Microalbuminuria co-exists with other major cardiovascular risk factors with a positive correlation.Prevalence of microalbuminuria increases with the age of the patient and the duration and severity of hypertension.Microalbuminuria is an integrated marker of cardiovascular risk and has statistically significant correlation with the presence and severity of target organ damage. More extensive screening for microalbuminuria should be performed in hypertensive subjects to facilitate better stratification of absolute cardiovascular risk and retinopathy.

Further studies are needed to evaluate the cost effectiveness of estimation of microalbuminuria so that it can be applied as a screening test in our population.

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