

A Study of Microalbuminuria in Patients with Essential Hypertension

Anil Kumar H.¹, Rekha N.H.², E. Dinesh Raghav³

ABSTRACT

Introduction: Hypertension is one of the commonest chronic disease in our country. The prevalence of hypertension is increasing day by day in our country. Improved mechanisation, increased sedentary life style coupled with increased work stress, obesity and abnormal eating habits all contribute to increasing incidence of hypertension. Our study aims at finding out the percentage of microalbuminuria in patients with hypertension and it's relationship with the duration of hypertension and target organ dysfunction.

Material and Methods: Our study was conducted in a tertiary care hospital. We studied 50 hypertensive patients who satisfied the inclusion criteria were included in the study. All patients underwent detailed clinical examination, ECG, 2D ECHO, fasting lipid profile and urine for microalbuminuria.

Results: In this study 50 patients with hypertension were observed for percentage of microalbuminuria positive patients and also as a marker for target organ dysfunction. The age group ranged from 36 years to 78 years. Majority of them were male patients. The prevalence of microalbuminuria among hypertensives increased steadily with the advancing age and the duration of hypertension. The prevalence of microalbuminuria was high as the lipid levels increased in both male and female patients.

Conclusion: In this study it was observed that the percentage of patients with microalbuminuria is more in patients with essential hypertension. Patients with advanced age and longer duration of hypertension develop microalbuminuria more commonly. Prevalence of microalbuminuria is more in patients with unfavourable lipid profile and there is high risk of development of target organ damage in patients with microalbuminuria.

Keywords: Microalbuminuria, Hypertension

INTRODUCTION

As India is progressing towards industrialisation and improved mechanisation, which has led to decreased work load and increased sedentary lifestyle of individuals, there is a rising trend of chronic life style diseases like Hypertension (HTN), Diabetes Mellitus, Obesity etc. Hypertension is an international problem with 13.5% of all deaths attributed to hypertension related deaths. It is also suggested that the prevalence of hypertension is rapidly increasing in developing countries and is one of the leading causes of death and disability in them.¹ The incidence of hypertension is increasing year after year and the prevalence of hypertension is increasing day by day due to increased life expectancy and aging population. The Jaipur heart watch study² and the Chennai Urban Rural Epidemiology study (CURES) reported the prevalence of hypertension to be 37% and 20% using the JNC- VII guidelines. The incidence of hypertension in India is 5 –15% in the adult population against 10–12% in the West. Unfortunately by the time most of the individuals are diagnosed with hypertension they have

already progressed into severe stage and many of them have already developed target organ damage like fatal stroke or myocardial infarction or irreversible renal failure.

Even in developed countries like United States 30% of hypertensives are unaware of it's presence, only 59% of hypertensives are on treatment and only 34% have good control of their blood pressure. Essential hypertension produces clinical proteinuria and a significant reduction in renal function in 5 –15% of patients. Several epidemiological studies have shown that proteinuria as well as microalbuminuria are independent predictors of cardiovascular morbidity and mortality in patients with essential hypertension. Moreover, 25% of patients with end stage renal disease have hypertension as the primary diagnosis.

Microalbuminuria is described as moderate increase in the urine albumin levels. Microalbuminuria is said to occur when there is leakage of small amounts of albumin into the urine and is said to be due to high permeability of the renal glomerulus for albumin. Microalbuminuria can be diagnosed from a 24-hour urine collection (between 30–300 mg/24 hours) or, more commonly, from elevated concentrations in a spot sample (30 to 300 mg/L). Microalbuminuria is predicted as an independent risk factor of cardiovascular mortality irrespective of its association with other cardiovascular risk factors. The risk of developing renal failure, ischemic and hemorrhagic stroke and peripheral arterial disease is doubled in the presence of microalbuminuria. This may be due to increased renal endothelial permeability and diffuse endothelial dysfunction. Hence diagnosis of microalbuminuria at an early stage helps to take proper precaution and to initiate appropriate management in hypertensive subjects. Trials have shown that lowering of albuminuria by either an angiotensin-converting enzyme (ACE) inhibitor or angiotensin II receptor blockers (ARB) was associated with a better renal and cardiovascular outcome. Moreover, it has been shown that the reno protective and cardio protective effects were related to the extent to which albuminuria was lowered.

In patients with primary hypertension, increased urine albumin ratio is associated with increased cardiovascular morbidity. In a large population based study of non diabetic hypertensives, the presence of microalbuminuria is associated

¹Associate Professor, ²Associate Professor, ³Post graduate, Department of Medicine, Rajarajeswari Medical College and Hospital, Kambipura, Mysore Road, Bangalore-74, India

Corresponding author: Dr. Anil Kumar H., Associate Professor, Department of Medicine, Rajarajeswari Medical College and Hospital, Kambipura, Mysore road, Bangalore-74, India

How to cite this article: Anil Kumar H., Rekha N.H, E. Dinesh Raghav. A study of microalbuminuria in patients with essential hypertension. International Journal of Contemporary Medical Research 2016;3(5):1468-1470.

with significantly higher prevalence of LVH, CAD, MI, Hyperlipidemia and peripheral vascular disease.³ In a study conducted by Dick de zeeuw et al in 2006,⁴ the prevalence of microalbuminuria in patients with hypertension was 8 to 23% in different cohorts. In a study conducted by S Jalal et al; it was found that microalbuminuria has a positive correlation with the severity of hypertension and thus may be an early marker for end-organ damage susceptibility.⁵ In a study conducted by Rodilla, Enrique et al;⁶ an association between serum uric acid, metabolic syndrome and microalbuminuria in previously untreated essential hypertensive patients was found. General population studies such as Prevention of Renal and Vascular End Stage Disease (PREVEND) showed an 8 to 11.5% prevalence of microalbuminuria in individuals with hypertension.

Aims and objectives of the research were to find out the percentage of patients with microalbuminuria in patients with essential hypertension and to assess the relationship of microalbuminuria with Target organ dysfunction in patients with essential hypertension like LVH, Stroke and Retinopathy.

MATERIAL AND METHODS

Adults aged more than 18 years attending Medical OPD, and patients admitted to the medical wards diagnosed to have essential hypertension in Raja Rajeswari Medical College and Hospital. The study was conducted over a period of 1 year and 50 patients meeting the inclusion criteria were taken. Ethical clearance was obtained from the ethical committee and informed consent was taken for all the patients included in the study.

Exclusion criteria

1. Proven cases of secondary hypertension
2. Diabetes mellitus
3. UTI
4. Pregnant women
5. Established cases of kidney diseases
6. Macroproteinuria
7. Strenuous exercise
8. CCF
9. Acute febrile illness
10. History of NSAID intake

The BP of each patient was measured according to JNC VII guidelines with a standardized calibrated measuring column type sphygmomanometer. BP above 140/90mm of Hg was regarded as Hypertension (JNC VII).

Each patient underwent detailed history taking and physical examination was performed on each patient. It was specifically emphasized on the assessment of the neurological status, cardiovascular status and fundoscopy. All patients underwent special investigations like fasting Lipid profile, ECG for LVH, Chest radiography and Microalbuminuria. Microalbuminuria was assessed by Latex turbidimetry. 5ml of random/first morning urine sample was used. In women examinations were done during non-menstrual phase of their cycles.

STATISTICAL ANALYSIS

Descriptive and inferential statistical analysis has been

carried out in the present study. Student t test (two tailed, independent) has been used to find the significance of study parameters on continuous scale between two groups (Inter group analysis) on metric parameters. Chi-square/ Fisher Exact test has been used to find the significance of study parameters on categorical scale between two or more groups.

RESULTS

In this study 50 patients with hypertension were observed for percentage of microalbuminuria positive patients and also as a marker for target organ dysfunction. There were 29(58%) male and 21 (42%) female patients (Table-1). The age group ranged from 36 years to 78 years. Maximum number of patients were in the age group 51-60yrs both in male and female patient groups (Table-1). Among the patients with hypertension as seen on 2D ECHO, LVH was noted in 21(42%) patients and microalbuminuria was noted in 12 (57.14%) of these patients which was statistically significant (Table-2). The prevalence of microalbuminuria among hypertensives increased steadily with the advancing age and the duration of hypertension. The prevalence of microalbuminuria was high as the lipid levels increased in both male and female patients (Table-3). Hypertensive retinopathy was noted in 15(30%) cases among which microalbuminuria was noted in 10 (66.7%) patients which was also statistically significant (Table-4).

DISCUSSION

In our study, there were 50 patients. The age group of study population ranged from 36 years to 78 years. Among 50 patients 29(58%) were male and 21(42%) were female patients.

A study conducted by Sharan badiger et al. in 2012⁷ showed the prevalence of microalbuminuria to be 63%. A study by Bohm et al. in 2007,⁸ prevalence of microalbuminuria was found to be 58.4%, in which male were affected more than female patients. A study by Hiitha et al. in the year 2008,⁹ in South India showed prevalence of microalbuminuria to be 26.6%. In our study the percentage of patients with microalbuminuria was found to be 32% in line with the other studies.

Prevalence of microalbuminuria in patients with unfavourable

Age in years	Gender		Total
	Female	Male	
31-40	4(19%)	4(13.8%)	8(16%)
41-50	7(33.3%)	6(20.7%)	13(26%)
51-60	8(38.1%)	13(44.8%)	21(42%)
61-70	2(9.5%)	5(17.2%)	7(14%)
>70	0(0%)	1(3.4%)	1(2%)
Total	21(100%)	29(100%)	50(100%)

Table-1: Age distribution of patients studied

Echo	Gender		Total
	Female	Male	
Negative	17(81%)	12(41.4%)	29(58%)
Positive	4(19%)	17(58.6%)	21(42%)
Total	21(100%)	29(100%)	50(100%)

Table-2: Echo findings

Variables	Microalbuminuria		Total	P value
	Absent	Present		
Age in years	49.56±9.32	58.56±7.79	52.44±9.75	0.002**
Duration Hypertension	3.76±3.88	7.56±5.55	4.98±4.77	0.007**
Total Cholesterol (mg/dl)	207.71±29.92	231.19±41.66	215.22±35.45	0.027*
TGL (mg/dl)	135.50±31.72	161.25±36.17	143.74±35.00	0.014*
HDL (mg/dl)	47.41±6.23	45.81±5.47	46.90±5.99	0.384

Table-3: Comparison of study variables in relation to Microalbuminuria

Findings	Microalbuminuria		Total (n=50)	P value
	Absent (n=34)	Present (n=16)		
ECG	7(13.3%)	14(66.7%)	21(42%)	<0.001**
Echo	9(42.9%)	12(57.1%)	21(42%)	0.001**
Retinopathy	5(13.3%)	10(66.7%)	15(30%)	0.002**
CVA	0(0%)	3(18.8%)	3(6%)	0.029*

Chi-Square test/Fisher Exact test

Table-4: Findings of ECG/ECHO/Retinopathy/CVA in relation to Microalbuminuria

lipid profile is more when compared to patients with favourable lipid profile. A study by Wachtell et al.,2002,¹⁰ showed an association with raised microalbuminuria and increased risk of heart attacks and stroke. Among the patients with hypertension, 21(42%) patients had LVH as noted on 2D ECHO and microalbuminuria was noted in 12 (57.14%) of these patients which was statistically significant. Monfared et al.2013,¹¹ study showed increased microalbuminuria is a risk factor for LVH which in turn an indicator of cardiovascular risk. A study by Bohm et al. 2007,⁸ showed microalbuminuria is an independent risk factor for cardiovascular risk.

The prevalence of microalbuminuria was also higher among those with hypertensive retinopathy in our study and it was statistically significant. Microalbuminuria is more prevalent in essential hypertensives with target organ dysfunction.¹² The shortcomings of this study is small study sample and also lack of controls. Large case control studies have to be done to confirm the above findings.

CONCLUSION

In our study it was observed that the percentage of patients with microalbuminuria is more in patients with essential hypertension. Patients with advanced age and longer duration of hypertension develop microalbuminuria more commonly. There is no statistically significant differences among both sex. Prevalence of microalbuminuria is more in patients with unfavourable lipid profile and there is high risk of development of target organ damage in patients with microalbuminuria in patients with essential hypertension. The shortcomings of this study is small study sample and also lack of controls. Large case control studies have to be done to confirm the above findings.

REFERENCES

1. Mohan V, Deep M, et al. Prevalence, awareness and control of hypertension in Chennai- the Chennai Urban Rural Epidemiology Study (CURES- 52). J Assoc Physicians India. 2007;55:326-32.
2. Gupta R, Gupta VP, et al. Prevalence of Coronary heart disease and risk factors in an urban Indian population:

3. Jaipur Heart watch- 2.V.Indian Heart J. 2002;54:59-66.
3. Agarwal B, Berger A, Wolf K, Luft FC. Microalbuminuria screening by reagent strip predicts cardiovascular risk in hypertension. J Hypertens. 1996;14:233-238.
4. Dick de zeeuw, Hans- Henric parving and Robert H.Henring. Microalbuminuria as an early marker for cardiovascular disease. J Am Soc Nephrol. 2006; 17:2100-2105.
5. S Jalal, FA Sofi, MS Alai, MA Sidiqqi, MA Bhat, KA Khan et al. Prevalence of microalbuminuria in essential hypertension. A study of patients with mild to moderate hypertension. Indian Journal of Nephrology. 2001;11: 6-11.
6. Enrique Rodilla Sala, Francisco Pérez Lahiguera, José Antonio Costa Muñoz, Carmen González Enguita, Amparo Miralles, Desamparados Moral et al. Association between serum uric acid, metabolic syndrome and microalbuminuria in previously untreated essential hypertensive patients. Medicina clínica. 2009;132: 1-6.
7. Sharan Badiger A: Study of microalbuminuria and Target organ Damage in patients with Essential Hypertension, Int J Biol Med Res. 2012;3:1351-1355.
8. Böhm M, Thoenes M, et al. Association of cardiovascular risk factors with microalbuminuria in hypertension individuals: the i-SEARCH global study. J Hypertens. 2007;25:2317-24.
9. Hitha B, Pappachan JM et al. Microalbuminuria in patients with Essential Hypertension and its relationship to Target organ damage: An Indian Experience. Saudi J Kidney Dis Transpl. 2008;19:411-419.
10. Hans Ibsen, Kristian Wachtell, et al. Albuminuria and cardiovascular risk in hypertensive patients with left ventricular hypertrophy: The LIFE Study: J Kidney International. 2004;66:S56-S58.
11. Monfared A, Salari A, et al. Left ventricular hypertrophy and microalbuminuria in patients with essential hypertension. Iran.J.Kidney Dis. 2013;7:192-7.
12. Torun d, Sezer S, et al. The frequency of combined target organ damage and the beneficial effect of ambulatory blood pressure monitoring in never treated mild to moderate hypertensive patients. Int. Heart. J 2005;46:1073-82.

Source of Support: Nil; **Conflict of Interest:** None

Submitted: 29-03-2016; **Published online:** 30-04-2016