

A Case Control Study of Microalbuminuria in Hypertensive Patients in A Tertiary Hospital, Tamilnadu

A. Thangadhurai¹, D. Girubaharan², AVM. Balaji³, P.Parameshwari⁴

¹Senior Assistant Professor, Department of General Medicine, Government Sivagangai Medical College, Sivagangai, Tamilnadu, India.

²Assistant Professor, Department of General Medicine, Government Sivagangai Medical College, Sivagangai, Tamilnadu, India.

³Senior Assistant Professor, Department of Microbiology, Stanley Medical college, Chennai, Tamilnadu, India.

⁴Associate Professor, Department of Community Medicine, Chengalpattu Medical college Chengalpattu, Tamilnadu, India.

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Abstract

Background: Hypertension is one of the major risk factor for an increased risk of stroke, myocardial infarction, end-stage renal disease, congestive heart failure and peripheral vascular disease. The kidney is a main target of organ damage in hypertension. Microalbuminuria is one of the earliest indications of kidney injury in patients with hypertension. Total of 50 cases and 50 controls are enrolled into the study. Their blood pressure was measured and spot urine sample was analyzed for Microalbumin. Blood pressure and Microalbumin were statically elevated in case group in comparison to control group.

Keywords: Microalbuminuria, hypertension

Corresponding Author: Dr.P.Parameshwari, Associate Professor, Department of Community Medicine, Chengalpattu Medical college Chengalpattu, Tamilnadu, India
Email id:-paramesh1584@gmail.com

Introduction

The hypertension was defined according to eighth report of Joint National Committee for detection, evaluation and treatment of high blood pressure, as systolic blood pressure more than or equal to 140 mm of Hg and diastolic blood pressure more than or equal to 90 mm of Hg or those individuals currently taking antihypertensive treatment¹. Hypertension also known as high blood pressure is one of the most common complex and public health problems which becomes more prevalent in developed and developing countries³

Hypertension has been named the "silent killer," as it is the major contributor-or risk factor-to cardiovascular morbidity and mortality. Although the causes-genetic and environmental-remain obscure, much progress has been made in elucidating some of the pathogenic mechanisms causing hypertension, as well as its common complications, i.e. Ischemic heart disease, stroke and renal failure⁴. Microalbuminuria is defined as the excretion of 30 to 300mg of albumin per day in urine. It is not a different form or fraction of albumin but just a very small amount of albumin. Albumin molecule is relatively small and it is often the first protein to enter the urine after the kidney is damaged.^{5,6} Glomerular hyperfiltration may be a second mechanism linking the higher level of albumin excretion with hypertension which reduces nephron number and /or increases activity of kidney rennin- angiotensin system, may

provide a link between higher levels of albumin excretion and the development of hypertension, among at high baseline risk for cardiovascular events.⁷ Microalbuminuria not only predicts the cardiovascular risk but also seems to be a sensitive marker for detecting new onset of other cardiovascular events like hypertension. Brantsma et al, found that microalbuminuria increased the risk of hypertension by two fold as compared to normal albuminuria levels.⁸ The association between microalbuminuria and hypertension was described by Parving et al, in 1974, microalbuminuria has a major impact on cardiovascular risk and become a prognostic marker for cardiovascular disorder, in essential hypertensive an increased transglomerular passage of albumin may result from several mechanisms like hyper filtration, glomerular basal membrane abnormalities, endothelial dysfunction and nephrosclerosis. Microalbuminuria has been proved to be a prognostic marker for the development of nephropathy in long standing diabetes patients.⁹

Material And Method

The present study was carried out on total 100 subjects, which were divided into two groups:

- a) Case groups (Hypertensive Subjects), n=50
- b) Control Groups (Non-Hypertensive Subjects), n=50 with no present and past family history of hypertension.

Subject with Diabetes mellitus, Cardiac patients, Alcoholic patients, Smokers, Renal failure, patient with nephropathy were excluded from the study. Spot urine sample was collected from the subject in container for the estimation of urine microalbumin level Sample was analyzed by using biochemistry auto analyzer. Bs-300 chemistry analyzer (Mindray) was used for the analysis of the urine microalbumin. Immunoturbidimetric method was used to estimate the level of microalbumin.¹⁰

Result

The present study is case control study where microalbuminuria was estimated, compared and correlated in hypertensive case group with healthy normotensive group. This was carried out on total 100 subjects, which were divided into two groups-case group consists of 50 subjects of known hypertensive patient and control group consists of 50 subjects who were healthy normotensive.

Table 1: Shows that the Mean age group of case study was 33.38 ± 5.33 , in which the age group consisted 34% of 25-30 years, 54% where in age group of 31-40 years, followed by 12% in the range of 41-50 years. Whereas the control group Mean was 33.84 ± 5.15 , consisting of 28% age group of 25-30 years, 58% seen in 31-40 years remaining 14% in 41-50 years age group. Suggesting the samples were age matched with $p=0.662$.

Table 1: Age distribution of subject studied

Age in years	Control		Cases	
	No	%	No	%
25-30	14	28.0	17	34.0
31-40	29	58.0	27	54.0
41-50	7	14.0	6	12.0
Total	50	100.0	50	100.0
Mean \pm SD	33.84 ± 5.15		33.38 ± 5.33	

Samples are age matched with $p=0.662$

Table 2: The percentage of gender studied showed that the control group with 50% male and 50% female when compared to case group male 54% and 46% female. Gender distribution

was statistically similar between two groups with $p=0.689$. Hence in the present study there is no significant difference in the prevalence of hypertension in between males and females.

Table 2: Gender distribution of subject studied

Gender	Control		Cases	
	No	%	No	%
Male	25	50.0	27	54.0
Female	25	50.0	23	46.0
Total	50	100.0	50	100.0

Samples are gender matched with $p=0.689$

Table 3: Shows that microalbumin levels in urine were 100% in normal range (<30 mg/l) in control, whereas the levels were 100% in higher range (>30 mg/l) in case group. Thus explaining that in case group there was significantly elevated urine microalbumin levels when compared to controls with $p<0.001$.

Table 3: Levels of microalbumin in urine in case and control

Urine micro albumin	Control		Cases	
	No	%	No	%
<30 mg/ltr	50	100.0	0	0.0
>30 mg/ltr	0	0.0	50	100.0
Total	50	100.0	50	100.0
Inference	Urine micro-albumin level is significantly elevated in cases compared to controls with $p<0.001^{**}$			

Table 4: Shows the comparison of Mean values of urine microalbumin in two groups studied where Microalbuminuria is significantly increased in case group with the Mean of 171.26 ± 348.93 when compared to control group Mean of 14.36 ± 8.78 with $p=0.002$. Thus showing a strong significant levels of urine microalbumin in cases when compared to control group.

Table 4: Mean levels of urine microalbumin in two groups

	Controls	Cases	P Value
Urine micro albumin	14.36 ± 8.78	171.26 ± 348.93	0.002^{**}

Discussion

Hypertension is a major public health problem in India and in other developing countries. Hypertension affects approximately 25% of the adult population worldwide and its prevalence is predicted to increase by 60% by 2025 A.D.¹¹ High blood pressure is an important independent predictor of the development and progression of chronic renal disease as well as morbidity and mortality in patients with chronic renal disease.¹²

The risk of renal failure associated with less severe hypertension is graded and continuous throughout the distribution of blood-pressure readings above the optimal level, making the kidney considered a target organ for hypertension.¹³ The increasing interest in the significance of Microalbuminuria in essential hypertension, is associated with an increased incidence of cardiovascular complications and morbid events, such as left ventricular hypertrophy, coronary heart disease, carotid artery thickness, renal failure and hypertensive retinopathy.¹⁴

In our study levels of urine microalbumin were significantly high in hypertensive patients compared to non-hypertensive patients which is matched with previous studies.^{15,16}

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