

Research Article



INTERNATIONAL RESEARCH JOURNAL OF PHARMACY

www.irjponline.com

ISSN 2230-8407 [LINKING]

MICROALBUMINURIA AS A PROGNOSTIC MARKER FOR DEVELOPING NEPHROPATHY IN INDIAN SUBJECTS WITH HYPERTENSION

Dr. Vamshi Krishna K.

Assistant Professor, Department of General Medicine, Dhanalakshmisrinivasan Medical College & Hospital, Siruvachur, Perambalur, Tamilnadu

Email id: Vamshikotturu@gmail.com

How to cite: Krishna VK. Microalbuminuria as a prognostic marker for developing nephropathy in Indian subjects with hypertension. International Research Journal of Pharmacy. 2022,13:11:56-59.

Doi: 10.56802/2230-8407.1303214

ABSTRACT

Background: A higher risk of peripheral vascular illnesses, congestive heart failure, end-stage renal diseases, myocardial infarction, and stroke is caused by hypertension, one of the main risk factors. One of the first signs of kidney damage in hypertensive individuals is microalbuminuria.

Aim: to determine whether albuminuria was present in hypertensive Indian participants.

Methods: Two groups of 200 hypertensive subjects—100 cases and 100 controls—were evaluated for the research. Blood pressure readings and a spot urine sample were taken from each of the included patients in order to determine whether microalbumin was present.

Results: The study revealed that the case group participants had higher blood pressure and microalbumin levels than the control group participants. The depicted difference was statistically significant with a p-value of <0.05.

Conclusions: blood pressure and microalbumin levels are significantly higher in subjects with hypertension. These parameters can be effectively used as reliable biomarkers for the early identification of kidney disease and injury in subjects with hypertension.

Keywords: Hypertension, microalbuminuria, kidney disease, kidney injury, blood pressure

INTRODUCTION

According to the eighth report of the Joint Committee for Detection, hypertension is defined as the identification, assessment, and treatment of high blood pressure in subjects currently receiving treatment for hypertension or with a systolic blood pressure of greater than or equal to 140 mmHg and a diastolic blood pressure of greater than or equal to 90 mmHg. Often referred to as high blood pressure, hypertension is one of the most complicated and widespread public health issues that affects both industrialized and developing countries, including India.¹

The silent killer, as it is sometimes called, is hypertension, a significant risk factor or contributor to cardiovascular death and morbidity. Hereditary and environmental factors are among the majority of the causes of hypertension that are yet unclear. The pathogenic process causing hypertension and its accompanying problems, such as ischemic heart disease, stroke, and renal failure, are being explained with great advancements.²

A person who excretes 30-300 mg of albumin per day in their urine is said to have microalbuminuria. It is analogous to a fraction of albumin with a very little amount of albumin. Albumin, a relatively smaller molecule, typically enters urine first after kidney failure. Glomerular hyperfiltration, which reduces the number of nephrons and/or increases the activity of the

kidney rennin-angiotensin system, is another mechanism that links hypertension to increased albumin production. It may establish a connection between the onset of hypertension and elevated albumin production in those at elevated risk for cardiovascular disorders.³

Microalbuminuria is a sensitive and accurate diagnostic to identify the new development of other cardiovascular problems, such as hypertension, in addition to predicting the risk of cardiovascular illnesses. According to evidence from earlier research, albuminuria doubles the risk of hypertension when compared to normal albuminuria levels.⁴

Given that microalbuminuria is a predictive marker for cardiovascular illnesses and has a significant impact on the risk of cardiovascular diseases, the association between hypertension and microalbuminuria has long been established in the literature. Hyperfiltration, glomerular basal membrane abnormalities, endothelial dysfunction, and nephrosclerosis are some of the factors that cause it to play a crucial role in boosting the trans-glomerular transit of albumin. It has been demonstrated that in individuals with chronic diabetes, microalbuminuria is a predictor of the development of nephropathy. Five Assessing the presence of albuminuria in hypertensive Indian participants was the goal of the current investigation.

MATERIALS AND METHODS

Assessing the presence of albuminuria in Indian participants with hypertension was the goal of the current cross-sectional clinical investigation. The study subjects were from the Department of Medicine of the Institute. Prior to their involvement in the study, all participants gave their verbal and written informed permission.

Two hundred volunteers of both sexes were evaluated for the study. Those without a fatal disease, those with hypertension, and those who were willing to engage in the study were the study's inclusion criteria. Subjects who did not consent to participate in the study, those with a history of kidney disease, end-stage kidney disease, renal failure, smoking, alcoholism, heart disease, diabetes mellitus, and those taking medications that could impact kidney function were all excluded.

200 participants were split up into two groups: 100 hypertensive subjects were in Group I, and 100 non-hypertensive subjects were in Group II and with no past or present history of hypertension. A thorough history was obtained from each participant when they were finally included in the research, and this was followed by a thorough clinical and laboratory assessment.

To determine the amounts of urine microalbumin, a spot pee sample was taken from each patient and placed in a container. A biochemistry autoanalyzer was used to evaluate every sample that was gathered. To detect the presence of microalbumin in the research participants' urine, an auto-analyzer was also employed. The immunoturbidimetric approach was applied to measure the microalbumin levels.

The Statistical Package for the Social Sciences (SPSS) software version 21.0 (IBM Corp., Armonk, NY, USA) was used to statistically analyze the collected data. This included chi-square, independent t-test, Mann Whitney U, and descriptive measure evaluation. The results were expressed as mean and standard deviation and frequency and percentages. The p-value of <0.05 was considered statistically significant.

RESULTS

The goal of the current cross-sectional clinical investigation was to determine if albuminuria was present in hypertensive Indian participants. 200 participants were split into two groups: 100 hypertensive subjects were in Group I, while the remaining subjects in Group II were both free of hypertension and had no history of hypertension. In the controls, 58% (n=58) of the study participants were between the ages of 31 and 40, followed by 28% (n=28) who were between the ages of 25 and 30 and 14% (n=14) who were between the ages of 41 and 50. The control group's average age was 33.82±5.13 years.

According to the instances, 54% of the subjects (n=54) were between the ages of 31 and 40, followed by 34% (n=34) who were between the ages of 25 and 30 and 12% (n=12) who were between the ages of 41 and 50. In the instances, the individuals' average age was 33.36±5.31 years. Table 1 shows that the difference between the cases and controls was statistically non-significant (p=0.64).

There were 50% (n=50) men and 50% (n=50) females in the control group, regarding the gender distribution of the two research subject groups. 54% (n=54) of the patients in this research were female, and 46% (n=46) were male. The gender difference between the research subjects' control and cases groups was statistically non-significant (p=0.66), as shown in Table 2.

Urine microalbumin levels in the cases and control study subjects were measured; 100% (n=100) of the controls had microalbumin levels less than 30 mg/ltr, whereas none of the cases group had any.

Nevertheless, none of the participants in the control group and all 100 subjects in the cases group had urine microalbumin levels greater than 30 mg/ltr. Table 3 shows that the difference between cases and controls was statistically significant ($p<0.001$).

According to study findings, Table 4 summarizes the mean urine microalbumin levels in participants with and without hypertension as well as controls. In the control group, the mean urine microalbumin was 14.34 ± 8.76 mg/ltr, which was substantially lower than in the cases where it was much higher at 171.24 ± 348.91 mg/ltr. Microalbumin levels in urine were substantially greater in cases than in controls ($p=0.002$) (Table 4).

DISCUSSION

The 200 participants were split into two groups. 100 hypertensive people were in Group I, and subjects with and without a history of hypertension were in Group II.

58% ($n=58$) of the study participants in the controls were between the ages of 31 and 40, followed by 28% ($n=28$) who were between the ages of 25 and 30 and 14% ($n=14$) who were between the ages of 41 and 50. The control participants were 33.82 ± 5.13 years old on average. 54% ($n=54$) of the subjects in the instances were between the ages of 31 and 40, followed by 34% ($n=34$) of the subjects who were between the ages of 25 and 30 and 12% ($n=12$) of the subjects who were between the ages of 41 and 50. The individuals in the instances were 33.36 ± 5.31 years old on average. With $p=0.64$, the difference between the cases and controls was statistically not significant. These findings were similar to those of studies conducted by Todkar SS et al. in 2009 and John P. Forman et al. in 2008, in which the authors evaluated participants using demographic information akin to that of the current investigation.

In terms of the gender distribution of the two research subject groups, 50% ($n=50$) of the control group consisted of men and 50% ($n=50$) of females. In the current study, there were 46% ($n=46$) men and 54% ($n=54$) females in cases. The gender difference between the research subjects' control and case groups was statistically not significant ($p=0.66$). These results were consistent with those of Vito M et al. (2000) and Robles NR et al. (2010), who evaluated participants with a comparable gender distribution to that of the current research.

According to the study findings, when the levels of microalbumin in the cases and control study participants were compared, 100% ($n=100$) of the controls and none of the cases group had urine microalbumin levels less than 30 mg/ltr.

However, none of the participants in the controls group and all 100 subjects in the cases group had urine microalbumin levels greater than 30 mg/ltr. Between cases and controls, the difference was statistically significant ($p<0.001$). These results aligned with those of Kearney PM et al. (2005) and Sabharwal RK et al. (2003), who stated that microalbumin levels were considerably higher in participants with hypertension comparable to the current research in their respective investigations.

The findings for the measurement of mean urine microalbumin in persons with and without hypertension, as well as controls, are compiled in Table 4. The mean urine microalbumin in the control group was 14.34 ± 8.76 mg/ltr, which was substantially lower than in the cases where it was significantly higher (171.24 ± 348.91 mg/ltr).

In cases, urine microalbumin was substantially greater than in controls ($p=0.002$). The current study's findings were consistent with those of Dick de Zeeuw et al. (2006) and John P. Forman et al. (2008), who found that the mean urine microalbumin levels of hypertension participants were considerably greater than those of non-hypertensive subjects.

CONCLUSION

Despite its limitations, the current study finds that individuals with hypertension have significantly higher blood pressure and microalbumin levels, and that these parameters can be used as trustworthy biomarkers to detect kidney damage and disease early in the course of hypertension. Longer monitoring periods and bigger sample numbers are required for future longitudinal investigations.

REFERENCES

1. Bilous RW. "Diabetes mellitus and the kidneys" In Warell DA, Cox TM, Firth JD, Jr. Benz Edwards J, editors. Oxford Text Book of Medicine 4th edn: New York. Oxford University Press 2003;1:374-80.
2. Kearney PM, Whelton M, et al. "Global burden of hypertension: analysis of worldwide data" Lancet. 2005;365:217-23.
3. David BS. "Carbohydrates" In Burtis AC, Ashwood RE, editors. Tietz textbook of clinical chemistry 3rd edn: Philadelphia: Saunders; 1999;1:798-801.

4. Haralambos Gavras. "Pathogenesis of Hypertension: A Review" Journal of Medical Sciences 2009;2:25-8.
5. Modupe Fisayo ASAOLU, Samuel Sunday ASAOLU, et al. "Evaluation of elements in the pathogenesis of hypertension in Nigerians" September-October. 2010;4:2.
6. Todkar SS, Venkatesh V Gujarathi, et al. "Period Prevalence and Sociodemographic Factors of Hypertension in Rural Maharashtra: A Cross-Sectional Study" Indian Journal of Community Medicine. 2009;3:34.
7. John P Forman, Naomi D.L. Fisher et al. "Higher levels of Albuminuria within the normal range predict incident hypertension." J Am Soc Nephrol. 2008;19:1983-8.
8. Vito M. Campese, Stefano Bianchi, et al. "Is microalbuminuria a predictor of cardiovascular and renal disease in patients with essential hypertension?" Current Opinion in Nephrology and Hypertension. 2000;9:143-7.
9. Robles NR, Juan F. Sanchez Munoz-Torrero, et al. "Prevalence and significance of mild renal dysfunction in a group of hypertensive patients followed-up in hypertension units. Port J Nephrol Hypert. 2010;2:153-7.
10. Kearney PM, Whelton M, et al. "Global burden of hypertension: analysis of worldwide data" Lancet. 2005;365:217-23.
11. Sabharwal RK, Parduman Singh et al. "Incidence of Microalbuminuria in Hypertensive Patients." Indian Journal of Biochemistry. 2003;23:71-5.
12. Dick de Zeeuw, Hans-Henrik Parving, et al. "Microalbuminuria as an Early Marker for Cardiovascular Disease." J Am Soc Nephrol. 2006;17:2100-5.
13. John P Forman, Naomi D.L. Fisher et al. "Higher levels of Albuminuria within the normal range predict incident hypertension." J Am Soc Nephrol. 2008;19:1983-8.

S. No	Age (years)	Controls		Cases	
		n=100	%	n=100	%
1.	25-30	28	28	34	34
2.	31-40	58	58	54	54
3.	41-50	14	14	12	12
4.	Total	100	100	100	100
5.	Mean $\pm$ S. D	33.82 $\pm$ 5.13		33.36 $\pm$ 5.31	

Table 1: Age distribution in two groups of study subjects (p=0.64)

S. No	Gender	Controls		Cases	
		n=100	%	n=100	%
1.	Females	50	50	54	54
2.	Males	50	50	46	46
3.	Total	100	100	100	100

Table 2: Gender distribution in two groups of study subjects (p=0.66)

S. No	Urine microalbumin	Controls		Cases	
		n=100	%	n=100	%
1.	<30mg/ltr	100	100	0	0
2.	>30mg/ltr	0	0	100	100
3.	Total	100	100	100	100
4.	p-value	<0.001			

Table 3: Levels of microalbumin in cases and control study subjects

S. No	Urine microalbumin	Controls		Cases		p-value
		n=100	%	n=100	%	
1.	Urine microalbumin	14.34 $\pm$ 8.76		171.24 $\pm$ 348.91		0.002

Table 4: Mean levels of urine microalbumin in cases and control study subjects

