

Original research article

# The Prevalence And Prognostic Significance Of Microalbuminuria In Non-Diabetic Acute Ischemic Stroke

**Dr. Kalaivani M**

Assistant Professor, Department of General Medicine, Raja Rajeshwari Medical College, Kambipura, Karnataka, India

**Dr. Mamatha B Patil**

Associate Professor, Department of General Medicine, Raja Rajeshwari Medical College, Kambipura, Karnataka, India

**Corresponding Author:**

Dr. Mamatha B Patil

## Abstract

**Background and Objective:** The aim of this study was to establish a correlation between microalbuminuria and the severity of stroke, as determined by the NIH Stroke Scale and Modified Rankin Scale.

**Method:** The study includes a total of 50 patients who have a history and clinical characteristics that indicate they have experienced acute ischemic stroke. These patients are matched in terms of age and sex with 50 controls who have been admitted to the hospital.

**Result:** Patients exhibiting microalbuminuria upon arrival demonstrated a higher NIHSS score, with a p-value of less than 0.05, indicating a very significant correlation with increased severity and worse prognosis. Patients exhibiting microalbuminuria demonstrated a significantly higher MRS score, with a p-value of less than 0.05, indicating a strong correlation with a negative prognosis.

**Conclusion:** It suggests that the occurrence of microalbuminuria is linked to a higher level of severity and a worse short-term prognosis. Therefore, they can serve as indications of the seriousness and short-term outlook in patients with acute ischemic cerebrovascular stroke.

**Keywords:** Ischemic stroke, microalbuminuria, non-diabetic, prognostic significance

## Introduction

A modest increase in urine albumin excretion (UAE) above normal, ranging from 30 to 300 mg per 24 hours, is referred to as microalbuminuria (MA). In European countries, MA affects 2.2-2.2% of the general population. Patients with MA who are hypertensive also have a higher mortality rate and are more likely to experience cardiovascular events. Higher UAE is a reliable indicator of higher mortality in the senior population and in every subject who is not diabetic. Persistent MA is thought to be a reflection of extensive arterial damage, which may put patients at risk for atherosclerosis and associated side effects [1-4].

Numerous acute diseases have also been linked to transient increases in UAE, including as acute pancreatitis, meningitis, acute myocardial infarction, and post-surgery. Furthermore, as an independent predictor of mortality in acute myocardial infarction, Berton *et al.* demonstrated the significance of transitory MA.

It is unknown how common MA is in non-diabetic patients who have experienced an acute stroke, nor how significant a predictor MA is of higher mortality in these patients [5-8].

## Material and Method

The current study includes a total of 50 patients who have a history and clinical signs that indicate they have experienced acute ischemic stroke. These patients were matched with 50 controls who have similar age and sex characteristics. The study took place at Department of General Medicine, RajaRajeshwari Medical College and Hospital, Karnataka, India from February 2009 to January 2010. All individuals in both the case and control groups did not have diabetes.

The inclusion criteria for cases consisted of patients of any age and both sexes who experienced their first ischemic stroke within 72 hours after the onset of symptoms. All patients provided informed consent. The inclusion criteria for controls were normal healthy persons who were matched for age and sex. They had no history of hypertension, diabetes, cerebrovascular stroke, hepatic insufficiency, or renal insufficiency.

Excluded from the study were patients who had hemorrhagic stroke, subarachnoid hemorrhage, or

cerebral venous thrombosis, patients with diabetes or hypertension, patients with systemic infection such as bacterial meningitis, patients with nephropathy or abnormal urinalysis, patients with neoplastic disease, and patients with a recent history of surgery or severe trauma<sup>[10-13]</sup>.

## Result

**Table 1:** Microalbuminuria and presenting symptoms

Presenting symptoms	Microalbuminuria		p-value
	Present (n=40)	Absent (n=10)	
Headache	5(10%)	3(6%)	0.4687
Vomiting	5(10%)	4(8%)	0.6456
Motor weakness	33(66%)	11(22%)	0.1986
<b>Loss of consciousness</b>	17(34%)	3(6%)	<b>0.0244</b>
Speech disturbance	16(32%)	7(14%)	0.9865
Vertigo	6 (12%)	0	0.2356
Tingling	0	2(4%)	0.0846
Convulsion	6(12%)	5(10%)	0.2097

**Table 2:** Microalbuminuria and NIHSS score

	Microalbuminuria		p-value
	Present (n=40)	Absent (n=10)	
<b>NIHSS &lt; 10</b>	16	9	0.0075
<b>NIHSS ≥ 10</b>	24	1	

**Table 3:** Microalbuminuria and MRS score

	Microalbuminuria		p-value
	Present(n=40)	Absent(n=10)	
<b>MRS ≤ 3</b>	20	9	0.0135
<b>MRS &gt; 3</b>	20	1	

## Discussion

This study is a case-control design with 95 patients who were hospitalized inside. There were 50 patients classified as cases and 50 patients classified as controls. All individuals in both the case and control groups did not have diabetes. Both the cases and controls were chosen based on their fulfillment of the inclusion criteria and their lack of fulfillment of the exclusion criterion. The mean age of the patients was 55.5 years. 52% of the patients were male and 48% were female. The ratio of males to females was 1.1:1<sup>[14, 15]</sup>. The predominant initial symptom reported by patients was motor weakness, followed by speech impairment. Microalbuminuria was detected in 34 out of 73.9% of patients who recently experienced an ischemic stroke, compared to 16 out of 34.7% of the control group. Patients who had a recent ischemic stroke were 5.31 times more likely to develop microalbuminuria compared to the control group (p value = 0.0001649)<sup>[16, 17]</sup>.

Acute phases of a number of clinical disorders, including myocardial infarction, have been linked to the appearance of MA.

In 44% of the patients examined by Berton *et al.* on the second day after a myocardial infarction, they discovered MA. By the third day, the prevalence of MA dropped to 29%, and by the seventh day, it had dropped to 14%, which was comparable to the rate in the control group.

These findings imply that an increase in albuminuria may occur even after mild ischemia events that last for a short while and don't cause any major aftereffects.

The only stroke risk factor that could distinguish acute stroke patients with MA from those without was age. All of the study's subjects, including the group of patients who had an acute stroke, showed an association between UAE and age. While the glomerular filtration rate decreases with age, there is a higher drop in renal plasma flow. Many studies have reported a rise in UAE with age, although others have contested this finding. The authors believe that rather than being a phenomena unique to acute stroke, the positive connection between age and UAE that was observed for the overall study group represents the pathophysiology of the aging kidney<sup>[18, 19]</sup>.

Recent research has demonstrated that, in patients suffering from an acute myocardial infarction, MA is an independent predictor of in-hospital mortality. Furthermore, it has been demonstrated that the lack of MA is a significant predictor of survival in patients with acute pancreatitis, as well as those who had had significant trauma or surgery. This study demonstrated a significant association between the severity of neurological deficit following a stroke and the existence of MA. Additionally, there was a higher likelihood of diminished consciousness in MA patients. All of these correlations were visible on the evaluation days. The predictive efficacy of MA was found to be independent of significant neurological deficit and decreased state of awareness, two characteristics that are known to indicate a worse prognosis

in acute stroke patients.

Although our study also documented the well-known significance of elevated body temperature soon after an ischemic stroke, this topic will not be further explored as it was not the study's goal. The occurrence of microalbuminuria was found to be linked to the experience of losing consciousness (p value= 0.025). Microalbuminuria can serve as an indicator of the extent or seriousness of an ischemic stroke<sup>[18]</sup>.

### Conclusion

The findings of our study suggest that the existence of microalbuminuria is linked to a higher degree of severity and a less favorable short-term prognosis. Therefore, they can serve as indications of the severity and short-term prognosis in individuals suffering from acute ischemic cerebrovascular stroke. These findings support the existing evidence and suggest that microalbuminuria could be used as an indicator of stroke risk and prognosis in those without diabetes.

**Funding support:** Nil.

**Conflict of interest:** None.

### References

1. Turaj W, Słowik A, Wyrwicz-Petkow U, Pankiewicz J, Iskra T, Rudzińska M, *et al.* The prognostic significance of microalbuminuria in non-diabetic acute stroke patients. *Medical Science Monitor.* 2001;7(5):CR989-CR994.
2. Słowik A, Turaj W, Iskra T, Strojny J, Szczudlik A. Microalbuminuria in nondiabetic patients with acute ischemic stroke: prevalence, clinical correlates and prognostic significance. *Cerebrovascular Diseases.* 2002;14(1):15-21.
3. Beamer NB, Coull BM, Clark WM, Wynn M. Microalbuminuria in ischemic stroke. *Archives of neurology.* 1999;56(6):699-702.
4. Metcalf PA, Scragg RKR. Epidemiology of microalbuminuria in the general population. *J Diabetes Complications.* 1994;8:157-163.
5. Parving HH. Microalbuminuria in essential hypertension and diabetes mellitus. *J Hypertens.* 1996;14(2):S89-S94.
6. Viberti GC, Jarrett RJ, Mahmud U, Hill RD, Argyropoulos A, Keen H. Microalbuminuria as a predictor of clinical nephropathy in insulin dependent diabetes mellitus. *Lancet.* 1982;i:1430-1432.
7. Messent JW, Elliot TG, Hill RD, Jarrett RJ, Keen H, Viberti GC. Prognostic significance of microalbuminuria in insulin-dependent diabetes mellitus: A twenty-three-year follow-up study. *Kidney Int.* 1992;41:836-839.
8. Bigazzi R, Bianchi S, Baldari D, Campese VM. Microalbuminuria predicts cardiovascular events and renal insufficiency in patients with essential hypertension. *J Hypertens.* 1998;16:1325-1333.
9. Damsgaard EM, Frøland A, Jørgensen OD, Mogensen CE. Microalbuminuria as predictor of increased mortality in elderly people. *BMJ.* 1990;300:297-300.
10. Yudkin JS, Forrest RD, Jackson CA. Microalbuminuria as predictor of vascular disease in non-diabetic subjects. *Lancet.* 1988;2:530-533.
11. Deckert T, Feldt-Rasmussen B, Borch-Johnsen K, Jensen T, Kofoed-Enevoldsen A. Albuminuria reflects widespread vascular damage: The Steno hypothesis. *Diabetologia.* 1989;32:219-226.
12. Gosling P, Hughes EA, Reynolds TM, Fox JP. Microalbuminuria is an early response following myocardial infarction. *Eur. Heart J.* 1991;12:508-513.
13. Shearman CP, Gosling P, Walker KJ. Is low proteinuria an early predictor of severity of acute pancreatitis? *J Clin Pathol.* 1989;42:1132-1135.
14. Roine I. Microalbuminuria: An index of severity in childhood meningitis. *Pediatr Infect Dis J.* 1993;12:584-588.
15. Smith FC, Gosling P, Sanghera K, Green MA, Paterson IS, Shearman CP. Microproteinuria predicts the severity of systemic effects of reperfusion injury following infrarenal aortic aneurysm surgery. *Ann Vasc. Surg.* 1994;8:1-5.
16. Berton G, Citro T, Palmieri R, Petuccio S, De Toni R, Palatini P. Albumin excretion rate increases during acute myocardial infarction and strongly predicts early mortality. *Circulation.* 1997;96:3338-3345.
17. Report of the WHO Task Force on Stroke and Other Cerebrovascular Diseases: Stroke: Recommendations on stroke prevention, diagnosis and therapy. *Stroke.* 1989;20:1407-1431.
18. Scandinavian Stroke Study Group: Multicenter trial of hemodilution in ischemic stroke: Background and study protocol. *Stroke.* 1985;16:885-890.
19. Guerrero-Romero F, Rodriguez-Moran M. Proteinuria is an independent risk factor for ischemic stroke in non-insulin-dependent diabetes mellitus. *Stroke.* 1999;30:1787-1791.