

## Role Of Microalbuminuria As A Risk Factor In Stroke.

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### Abstract:

**Background and objectives:** Cerebrovascular stroke is one of the leading causes of death in HTN patients. This study was designed to evaluate the role of microalbuminuria and urine albumin creatinine ratio as biomarkers in acute ischemic stroke patients.

**Materials and Method:** This study included 68 acute ischemic stroke patients admitted to the wards of Department of Medicine, S.C.B Medical College Cuttack and an equal number of age and sex matched healthy volunteers. The severity of stroke was assessed as per the National Institute of Health stroke score on day 0 at admission. The urinary MA was estimated by immunoturbidimetry method on day 0, 3<sup>rd</sup>, 7<sup>th</sup> and 14<sup>th</sup>.

**Results:** We found a strong positive association of urinary MA with the severity of stroke.

**Conclusion:** Urinary MA can be used as an independent risk factor and prognostic marker to assess the severity of cerebrovascular stroke in HTN patients.

**Key words:** Cerebrovascular disease, Ischemic stroke, Microalbuminuria

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### I. Introduction

WHO defines stroke as rapidly developing clinical signs due to focal disruption in cerebral function, which last for more than twenty four hours or which can cause death without any apparent reason other than vascular origin (1). Stroke or cerebrovascular disease accounts for the largest no of death and disabilities worldwide (2). The lack of awareness programmes, regarding prevention and early medical management is also improper. This leads to an increase in prevalence and incidence of stroke, thus increasing the economic burden. All this can be prevented by assessing well defined modifiable risk factors and take preventive measures.(3)

Cerebrovascular stroke is classified into ischemic stroke and hemorrhagic stroke. Of these, the incidence of ischemic stroke is a consequence of obstruction of blood vessels by a thrombus or embolus (4) These are peripheral vascular complications of hypertension. The risk factors of HTN leading to Ischemic stroke which can be modified are smoking, high fat diet, sedentary life style, obesity and inflammation (5,6 ). The biomarkers of inflammation include C-reactive protein (CRP), lipoprotein associated phospholipase A2, increased leucocyte count, pro inflammatory interleukins, endothelial nitric oxide, lipoprotein (a), homocysteine, tissue factors, intracellular adhesion molecules ,plasma fibrinogen as risk factors for cerebrovascular ischaemic stroke(7). A new risk factor in the group is Microalbuminuria(8).

Microalbuminuria (MA) is defined as urinary albumin excretion in a day(24 hours) and the normal biological reference is 30-300 microgram /24 hrs. This can also be assessed by measuring the urinary albumin creatinine ratio ( ACR) in the morning first sample and the normal biological reference range is 30-300 mg/g(9).the National nutrition examination survey conducted by United States suggested that microalbuminuria is most common in HTN and Diabetic patients but also found in 5% healthy volunteers (10,11)Microalbuminuria is a marker for vascular endothelial dysfunction (12). Recent studies have suggested that, Microalbuminuria may have a role in vascular endothelial damage, renal dysfunction and inflammation. Recent research have observed that, microalbumin is an independent risk factor for haemorrhagic cerebrovascular stroke and is positively correlated with Carotid artery intimal thickness. Hence Microalbuminuria is an established marker of cerebrovascular endothelial dysfunction and atherosclerosis(13). However, there is not much data regarding the role of Microalbuminuria as an independent risk factor for ischemic cerebrovascular stroke or as a prognostic marker in stroke(14,15)Hence this study was designed to evaluate the role of Microalbuminuria and UACR as an independent risk factor and a potential prognostic marker in acute cerebrovascular ischemic stroke.

### II. Materials And Methods

This case control study was done during September 2015 to January 2017 in S.C.B Medical college, Cuttack over a period of seventeen months The study included 68 acute ischemic stroke patients (5 females,63

males) within the age group of 45 to 70 yrs. All these patients presented at the hospital within 24 hours of stroke. We also included age and sex matched healthy volunteers as controls.

The urine MA and ACR was estimated at the time of admission and on the 7<sup>th</sup> day. The severity of stroke was evaluated by NIHSS score (16) at admission and on day 7. Urine albumin was measured by immunoturbidometry method using commercial kits adapted to auto analyzer.

**Statistical Analysis:**

All data is represented as Mean ± Standard Deviation, The data was compared by student ‘t’ test and the chi-square test.

P value < 0.05 was considered significant. All statistical analysis was done by taking SPSS 19 version.

**III. Results**

**Table-1**

	MA Positive	MA Negative
Cases	52	16
Control	1	67

**Table – 2:** Depicts the comparison of MA in cases and controls

	Cases	Controls	P value
No	68	68	NS
MA level	66.8 ± 1.2	7.1 ± 0.42	<0.001

**Table – 3:** Depicts the urinary MA levels in different days.

Days	MA positive	MA negative
0	52	0
3 <sup>rd</sup> Day	46	22
7 <sup>th</sup> Day	26	42
14 <sup>th</sup> Day	14	54

**Table – 4:** Association of urinary MA with stroke severity as per NIHSS score

NIHSS score	MA positive	Percentage
Mild	1	1/68x100= 1.47
Moderate	9	9/68 x100=13.23
Severe	22	22/68x100=32.35
Very severe	36	36/68x100=52.94

Comparison with chi-square test with 3 degrees of freedom shows a significant p value of <0.001

**IV. Discussion**

In our study, we observed that on day 0, out of 68 cases 52 stroke patients were positive for urinary MA and the no of MA positive patients decreased. Thus, we suggest that MA is an independent risk factor in acute ischemic cerebrovascular stroke in HTN patients, and our observation is in concurrence with previous studies (16-20).

The various reasons of urinary MA excretion in cerebrovascular stroke are lipid insulation, raised sialic acid, impaired vasodilatory capacity, hyper homocysteinemia and damaged basement membrane (20,23).

**V. Conclusion**

The clinical implication of our study is that, all patients with HTN should be monitored for urinary MA, as it is an independent risk factor for cerebrovascular stroke. We also found that urinary MA is significantly associated with the severity of stroke. Hence we suggest that, urinary MA may be used as a prognostic marker as it is a non invasive and less expensive test.

However we suggest a similar study should be conducted with a larger study group..

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**Conflict of Interest:** None

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