

# Association of Microalbuminuria With Recent Ischemic Stroke

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## ABSTRACT

**Introduction:** Microalbuminuria is considered as an indicator of increased mortality in diabetes mellitus, hypertension and myocardial infarction and is also attributed to increased cerebrovascular risk. The aim of this study was to evaluate microalbuminuria in patients of recent ischemic stroke and see if microalbuminuria is significantly associated with recent ischemic stroke.

**Methods:** From August 2015 to November 2015, all patients of first episode ischemic stroke presenting to Tribhuvan University Teaching Hospital emergency within 24 hours of onset of stroke suggestive symptoms were enrolled in this study. Non contrast CT scan head, random blood glucose, and urine spot microalbumin test was done in each case.

**Results:** Microalbuminuria was predominantly present in a total of 27 (79.4%) subjects, while absent in 7 (20.6%). Microalbuminuria was present in 77.0% of the non hypertensive cases and 85.71% of hypertensive cases. Microalbuminuria was present amongst 74.1% of non diabetics and in all the diabetics. Microalbuminuria was present in 78.6% of smokers and in 80% of non smokers. Microalbuminuria was present in 91.67% of cases with lacunar stroke and in 72.7% cases with territorial infarction.

**Conclusions:** There was no statistically significant association between microalbuminuria and ischemic stroke.

**Keywords:** ischemic stroke; microalbuminuria.

## INTRODUCTION

Cerebrovascular accident or stroke is defined as abrupt onset of neurologic deficit that is attributable to a focal vascular cause. Stroke is the third most common cause of death in the developed world after cancer and ischemic heart disease.<sup>1</sup> Stroke is the third leader killer disease in Nepal and there have been 15,333 deaths which accounts for 9.67% of the total deaths in 2013 in Nepal. Recently microalbuminuria has been proposed as one of the risk factors for development of ischemic stroke.<sup>2</sup> Microalbuminuria which is a simple test that can also be done with a spot urine kit can well be a screening tool for patients at high risk of developing ischemic stroke in near future.

So, this study on microalbuminuria and its association with ischemic stroke may help the clinicians in coming future for using it as a screening tool for ischemic stroke and in preventing development of ischemic stroke in the high risk cases and thus limit its burden on the society.

This present study was conducted with objective to find the association between microalbuminuria and recent ischemic stroke in patients presenting to the emergency.

## METHODS

This cross sectional observational study was conducted in the emergency department of Tribhuvan University Teaching Hospital, Maharajgunj, Kathmandu. The study sample consisted of patients of first episode of recent ischemic stroke presenting to emergency department of Tribhuvan University Teaching Hospital, Maharajgunj, Kathmandu from August 2015 to November 2015 after approval from Institutional Research Committee. The

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inclusion criteria included:

- Patients of any age and both gender with first episode ischemic stroke presenting within 24 hours of onset of symptoms
- Diagnosis of stroke being established by the WHO definition of stroke
- Ischemic lesion confirmed or hemorrhage ruled out by CT Scan or MRI brain
- Normal urine analysis
- Written Informed consent from patient or a valid surrogate

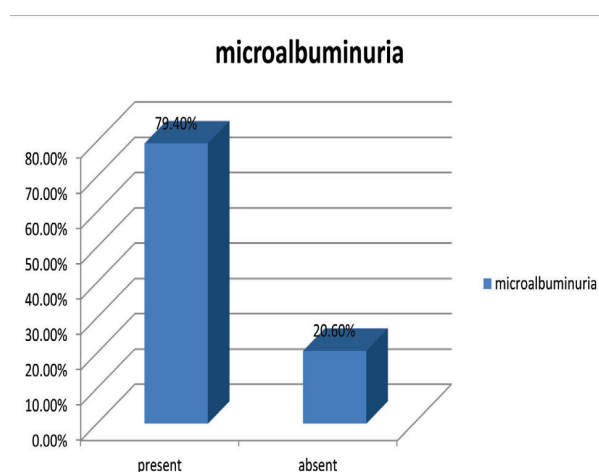
Whereas exclusion criteria comprised of:

- Patients with hemorrhagic stroke
- Patients with recurrent stroke
- Patients with diagnosed nephropathy and abnormal urine analysis
- Past history of acute myocardial infarction
- Patients with cardioembolic stroke

Total of 34 patients were enrolled in the study using convenient sampling method. Microalbuminuria test based on semi automated affinity chromatography was done using urine spot test via Nycocard reader. The findings were filled in the proforma developed for this study and the result obtained was analyzed in SPSS version 21. Microalbuminuria and its association with Recent ischemic attack were evaluated. The significant level was set to be ( $P < 0.05$ ). Each continuous parameter between two groups of patients with and without microalbuminuria were analysed with two tailed chi square test, Fisher's exact test and independent samples t test. Correlation coefficient was calculated of various tests and compared. Ninety-five percent confidence intervals were used in all analyses.

## RESULTS

Microalbuminuria was predominantly present in a total of 27 (79.4%) subjects, while absent in 7 (20.6%) (Figure1).



**Figure 1. Bar Diagram Showing incidence of Microalbuminuria in recent Ischaemic Stroke.**

Microalbuminuria was present in 77.0% of the non hypertensive cases and 85.71% of hypertensive cases. Microalbuminuria was present amongst 74.1% of non diabetics and in all the diabetics. Microalbuminuria was present in 78.6% of smokers and in 80% of non smokers. Microalbuminuria was present in 91.67% of cases with lacunar stroke and in 72.7% cases with territorial infarction.

## DISCUSSION

This study enrolled 34 cases of first episode recent ischemic stroke presenting to the emergency department of Tribhuvan University Teaching Hospital. The main aim of this study was to investigate if there is any significant relation between microalbuminuria and recent ischemic stroke. Incidence of microalbuminuria in this study was higher than other contemporary studies. The difference in incidence of microalbuminuria could be due to different study population and age group and smaller sample size of the present study. This study did not show any statistically significant association between Hypertension and microalbuminuria and Diabetes mellitus and microalbuminuria as well ( $P$  values = 0.5 and 0.3 respectively). The main reason behind this is the short duration and small sample size included in this study. Study done by Mlacak B. et al. showed significantly high incidence of microalbuminuria in Diabetics and Hypertensive cases.<sup>3</sup> Nidhinandana

et al at Thailand also found out that microalbuminuria was 5 times higher in hypertensive patients as compared to non hypertensive controls which was statistically significant.<sup>4</sup> Similarly, Yudkin et al found out that there was significant correlation between microalbuminuria, systolic blood pressure, diastolic blood pressure and 2 hour post prandial blood glucose.<sup>5</sup> Study done by Kathryn A. Kohler et al in African-American population showed linear dose response between microalbuminuria and smoking { an OR of 1.69 (95% CI 1.12– 2.56)}. A case control study by Das P. et al in Dhaka, Bangladesh showed the incidence of microalbuminuria was almost 4 times higher in patients of ischemic stroke compared with the controls. Smoking showed a statistically significant positive correlation with the presence of Microalbuminuria but this study did not reveal any statistically significant association between microalbuminuria and smoking (P value>0.05).<sup>2</sup> Most probably this is because this study didn't quantify smoking in pack years and labelled everyone with at least one year of smoking on a regular basis as smokers. Study done by Ravera M et al showed statistically significant higher prevalence of microalbuminuria in patients with lacunar infarction (P value 0.03).<sup>6</sup> A case control study by Das P. et al in Dhaka, Bangladesh showed that effect of microalbuminuria was 21.7% higher in lacunar stroke compared to territorial infarction which is significant.<sup>2</sup> Study done by Yuyun MF et al concluded that microalbuminuria is independently associated with approximately 50% increased risk of stroke in the general population.<sup>7</sup> This study failed to demonstrate such a significant association (P value 0.192) which is mostly because the sample size was small and most of the cases enrolled in this study had territorial infarction and only one-third cases had lacunar infarction. There was no statistically significant difference in microalbuminuria between male and female groups in this study which is consistent with the studies done by Turaj et al. The peak age group of the cases with ischemic stroke was (51-60) years 41.2% which was similar to the Nepal's current status of ischemic stroke.<sup>8</sup> Most of the cases presented to our emergency department within (9-16) hours as most (64.7%) were from urban areas. This study did not show any statistically significant association between headache, loss of consciousness and seizure

with microalbuminuria.

The principal limitation of the study relates to the small sample size and convenient sampling method because of which it is more likely to have selection bias and high level of sampling error and the results thus obtained cannot be generalized. Also, As this study was a cross sectional study the cases of ischemic stroke were not followed up after admission in the Neurology ward, thus this study could not say much about prognostic significance of microalbuminuria in ischemic stroke cases.

## CONCLUSIONS

Though microalbuminuria was present in majority of the cases, no statistically significant association was found between microalbuminuria and recent ischemic stroke. There was no significant association between smoking and microalbuminuria; microalbuminuria and lacunar infarction. This study failed to show any statistically significant difference between hypertensive and non hypertensive and diabetic and non diabetic recent ischemic stroke patients. A larger study with probability sampling is recommended.

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**CONFLICT OF INTEREST:** None.

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