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Pattern and Frequency of Microalbunuria with Different Types of Stroke

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Abstract

Introduction with aim and objectives: Cerebrovascular diseases have recently emerged as a major health problem affecting the elderly population. The spectrum includes some of the most common and devastating disorders like ischemic stroke, hemorrhagic stroke and anomalies in vascular system. Microalbuminuria is an early finding in urine in the patients of diabetes and hypertension and it is associated with macrovascular complications like cerebrovascular accident and myocardial infarction. The aim of this study was to find out the pattern and frequency of microalbunuria with different types of stroke. Materials and Methods: Fifty cases of stroke Patients admitted in CMCH medicine and neurology department from 1 January 2019 to 31 June 2019 were analyzed and urine for microalbumin was done. Univariate statistical analyses were performed to see the outcome in relation with blood volume by SPSS-19. Results: Regarding analysis of gender distribution of 50 study patients, 27(60%) were found male and 23(40%) were found female. Male to female ratio was 1:0.4. Among the 50 patients, different types of occupation were found. House wife was common occupation. Among the total patients, most of them were from lower middle class 24(61.4%). Others were from low 16(32.0%) and upper middle class 10(5.75%) group. Most of the patients were from rural residence 41(80%). In our study, 13(71.42%) patients had hypertension. Diabetes mellitus was found among 13(8.57%). Different examination findings were analyzed where mean GCS of ischaemic stroke was 14.5 and mean GCS of hemorrhagic stroke was 10.6, 12 patients had abnormal fundoscopic findings. Regarding analysis of serum LDL and serum Creatinine, mean LDL level was 123.95 and mean serum Creatinine level was 1.19. After analysis, mean of urine for Microalbumin of 30 Ischaemic stroke patients was 71.96mg/L and mean of urine for Microalbumin of 20 Hemorrhagic stroke patients was 80.70mg/L. Conclusions: We found high frequency of microalbuminuria in patients with stroke Therefore; microalbuminuria could be is a useful modifiable factor, in addition to conventional risk factors, in identifying those at increased risk of stroke.

Keywords: Risk factors, Stroke, Microalbuminuria.

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Introduction:

Stroke is a global health problem. It is the leading cause of adult disability and the second leading cause of mortality worldwide[1]. It is a leading cause of functional impairment, with 20% of survivors requiring institutional care after three months and 15%-30% being permanently disabled[1]. Compared with the volume of prospective studies in coronary heart disease, there have been relatively fewer population studies investigating the risk of stroke. Current treatments for patients with established stroke are relatively less effective and risk factor interventions are the real hope of reducing stroke morbidity and mortality in populations[2,3]. Stroke or cerebrovascular disease (CVD) is the clinical designation for a rapidly developing loss of brain function due to a disturbance in the blood vessels supplying blood to the brain. This phenomenon can be due to ischemia (lack of blood supply) caused by thrombosis or embolism or due to a hemorrhage[4]. Microalbuminuria is the excretion of greater than 30 mg and less than 300 mg a day of albumin in the urine. The normal urinary albumin is less than 30 mg per 24 hours. Stroke is a medical emergency and can cause permanent neurological damage, complications and death if not promptly diagnosed and treated. It is the third leading cause of death and the leading cause of serious disability[5], with major societal consequences. Risk factors for stroke include advanced age, hypertension (high blood pressure), previous stroke or

transient ischaemic attack (TIA), diabetes mellitus, high cholesterol, cigarette smoking, atrial fibrillation, migraine with aura, and thrombophilia (a tendency to thrombosis). Although microalbuminuria is associated with clinical risk factors for stroke, including diabetes, hypertension, aging, history of myocardial infarction, and left ventricular hypertrophy, there is surprisingly little information regarding it as an independent risk factor for stroke or as a predictor of stroke outcome. A large prospective study[6] has reported that microalbuminuria is a risk factor for stroke in men, and a limited case-control study[7] found that the highest quintile of microalbuminuria values was associated with a 13- fold increased risk for stroke. Although microalbuminuria is more prevalent in diabetes and/or hypertension, 2 classic risk factors associated with intracranial arteriosclerosis, reduced microvascular perfusion, and lacunar infarcts, there is scant data regarding the incidence of microalbuminuria in lacunar stroke. More recently, a highly significant association between microalbuminuria and carotid artery intima-media thickness has been reported, a finding which suggests that microalbuminuria may be a a marker for early development of carotid artery atherosclerosis and points to a possible linkage between microalbuminuria and atherothrombotic stroke mechanism[8]. With the introduction of more sensitive and relatively inexpensive dipstick methods, patients can now be readily screened for microalbuminuria. This present study is designed, therefore, to determine (1) the incidence of microalbuminuria in different types of stroke, (2) its relationship to risk factors for stroke, (3) its prevalence in major subtypes of stroke, and (4) its potential use as a marker for stroke recurrence.

Materials and Methods:

Fifty cases of stroke Patients admitted in CMCH medicine and neurology department from 1 January 2019 to 31 June 2019 were analyzed and urine for microalbumin was done. Patients with a history of stroke and/or transient ischemic attack were eligible for the risk group provided they had experienced no cerebrovascular symptoms for at least 6 months prior to enrollment. Patients with urinary tract infection, chronic renal failure, malignancy, and vasculitis were excluded. A detailed description of additional exclusions, diagnostic criteria for risk factor assessment, and definition of vascular end points has been published. 5 Vascular end points included recurrent stroke, myocardial infarction, and vascular death; transient ischemic attacks were noted but not counted as end points. Participants in all groups were examined at enrollment, 6 to 8 weeks, 6 months, 1 year, and once a year thereafter until termination of the study or the occurrence of a vascular event.

To minimize potentially confounding factors present at onset of stroke, urinary albumin levels in the recent stroke group were studied at the first outpatient clinic visit 6 to 8 weeks after the indexing infarction. Collection kits and instructions for obtaining first morning void urine samples on 2 consecutive days were mailed to patients prior to clinic. Urine samples were kept at 4°C for a maximum of 5 days. Duplicate determinations were performed on samples from each day and the results averaged. Normoalbuminuria was defined as a urinary albumin concentration 20 mg/L or lower, microalbuminuria as higher than 20 mg/L but lower than 200 mg/L, and macroalbuminuria as higher than 200 mg/L). Univariate statistical analyses were performed to see the outcome in relation with blood volume by SPSS-19. Except when stated otherwise, summary statistics are expressed as the mean±SD.

Result:

Regarding analysis of gender distribution of 50 study patients, 27(60%) were found male and 23(40%) were found female. Male to female ratio was 1:0.4. Among the 50 patients, different types of occupation were found. House wife was common occupation. Among the total patients, most of them were from lower middle class 24(61.4%). Others were from low 16(32.0%) and upper middle class 10(5.75%) group. Most of the patients were from rural residence 41(80%). In our study, 13(71.42%) patients had hypertension. Diabetes mellitus was found among 13(8.57%). Different examination findings were analyzed where mean GCS of ischaemic stroke was 14.5 and mean GCS of hemorrhagic stroke was 10.6, 12 patients had abnormal fundoscopic findings. Regarding analysis of serum LDL and serum Creatinine, mean LDL level was 123.95 and mean serum Creatinine level was 1.19. After analysis, mean of urine for Microalbumin of 30 Ischaemic stroke patients was 71.96mg/L and mean of urine for Microalbumin of 20 Hemorrhagic stroke patients was 80.70mg/L

Table-I: Distribution of the stroke patients diagnosed by CT scan (n = 50)

CT Scan Diagnosis	Frequency	Percentage (%)
Ischaemic Stroke	30	60.0
Haemorrhagic Stroke	20	40.0
Total	50	100.0
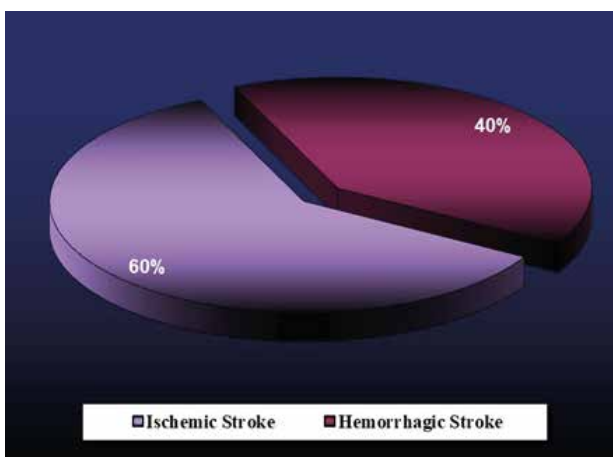
Fig-1: Distribution of the stroke patients.

Table- II: Distribution of socio-demographic variables among the stroke patients (n = 50)

Socio-Demographic Variables		CT Scan Diagnosis				Total	
		Ischemic Stroke (n = 30)		Hemorrhagic Stroke (n = 20)			
		n	%	n	%	n	%
Sex	Male	14	46.7	09	45.0	23	46.0
	Female	16	53.3	11	55.0	27	54.0
Age Group	30-39 Years	01	3.3	01	5.0	02	4.0
	40–49 Years	03	10.0	03	15.0	06	12.0
	50–59 Years	08	26.7	07	35.0	15	30.0
	≥ 60 Years	18	60.0	09	45.0	27	54.0
Residence	Urban	04	13.3	05	25.0	09	18.0
	Rural	26	86.7	15	75.0	41	82.0
Occupation	Service Holder	03	10.0	01	5.0	04	8.0
	Businessman	01	3.3	02	10.0	03	6.0
	House Wife	07	23.3	06	30.0	13	26.0
	Others	19	63.4	11	55.0	30	60.0
Socio-Economic Condition	Lower	09	30.0	07	35.0	16	32.0
	Lower Middle	13	43.3	11	55.0	24	48.0
	Upper Middle	08	26.7	02	10.0	10	20.0

Table-III: Distribution of risk factors among the stroke patients (with X^2 test significance)

Risk Factors		CT Scan Diagnosis				Total		X^2 Test Significance
		Ischemic Stroke (n =30)		Hemorrhagic Stroke (n= 20)				
		n	%	n	%	n	%	
Hypertension	Present	19	63.3	14	70.0	33	66.0	X^2= 0.238
	Absent	11	36.7	06	30.0	17	34.0	P=0.626[NS]
Diabetes Mellitus	Present	08	26.7	05	25.0	13	26.0	X^2= 0.017
	Absent	22	73.3	15	75.0	37	74.0	P=0.895[NS]
Cigarette Smoking	Present	05	16.7	09	45.0	14	28.0	X^2= 4.778
	Absent	25	83.3	11	55.0	36	72.0	P =0.029[S]

* NS = Not Significant (P > 0.05); S = Significant (P < 0.05)

Table-IV: Distribution of the fundoscopic findings among the stroke patients (with X^2 test significance)

Fundoscopic Findings	CT Scan Diagnosis				Total	
	Ischemic Stroke		Hemorrhagic Stroke			
	n	%	n	%	n	%
Normal	26	86.6	12	60.0	38	76.0
Hypertensive Retinopathy	02	6.7	08	40.0	10	20.0
Diabetic Retinopathy	02	6.7	00	0.0	02	4.0
Total	30	100.0	20	100.0	50	100.0

* X^2 value = 9.123. P = 0.010. Significant (P < 0.05)

Table-V: Level of consciousness (measured by Glasgow coma scale) among the stroke patients according to CT scan diagnosis (with t-test significance)

	CT Scan Diagnosis	N	MEAN ± SD	MEDIAN	RANGE	SIGN.*
Glasgow Coma Scale (GCS)	Ischemic Stroke	30	14.50 1.04	15.00	12-15	t= 4.445
	Hemorrhagic Stroke	20	10.60 3.83	9.50	4-15	P= 0.000
	TOTAL	50	12.94 3.17	15.00	4-15	HS

* Independent sample t – test. HS = Highly Significant (P < 0.001)

Table-VI: Biochemical profiles among the stroke patients according to CT scan diagnosis (with t-test significance)

Biochemical Profiles	CT Scan Diagnosis	N	MEAN	± SD	MEDIAN	RANGE	SIGN.*
Random Blood Sugar (mmol/L)	Ischemic Stroke	30	8.45	4.53	7.25	4.55 – 28.00	t=1.277
	Hemorrhagic Stroke	20	10.61	7.46	8.19	4.50 – 30.68	P=0.208[NS]
	TOTAL	50	9.31	5.90	7.76	4.50 – 30.68	
Serum LDL Cholesterol (mg/dl)	Ischemic Stroke	30	125.13	27.50	120.00	86–220	t=0.311 P=0.757 NS
	Hemorrhagic Stroke	20	122.19	39.34	120.00	57– 219	
	TOTAL	50	123.95	32.40	120.00	57–220	
Serum Creatinine (mg/dl)	Ischemic	30	1.06	0.24	1.00	0.70–1.70	t=1.723 P=0.099 NS
	Hemorrhagic Stroke	20	1.38	0.81	1.04	0.72–3.70	
	TOTAL	50	1.19	0.56	1.00	0.70–3.70	

* Independent samples t-test. NS = Not Significant (P > 0.05)

Table-VII: Microalbuminuria among the stroke patients according to CT scan diagnosis (with t-test significance)

	CT Scan Diagnosis	N	MEAN	±SD	MEDIAN	RANGE	SIGN.*
Urine for Microalbumin (mg/L)	Ischemic Stroke	30	71.96	75.95	32.87	14.90 – 260.00	t = 0.380 P = 0.706 NS
	Hemorrhagic Stroke	20	80.70	85.12	45.00	15.30 – 280.00	
	TOTAL	50	75.45	79.00	37.22	14.90 – 280.00	

*Independent samples t-test. NS = Not Significant (P > 0.05)

Table-VIII: Pearson's correlation between urinary microalbumin & GCS,RBS,LDL Cholsterol and Serum Creatinine variables (n = 50)

Correlation between	Correlation Coefficient (r)	Significance
Urinary Microalbumin & Glasgow Coma Scale	–0.124	P=0.391 Not Significant
Urinary Microalbumin & Random Blood Sugar	+0.196	P=0.172 Not Significant
Urinary Microalbumin & Serum LDL Cholesterol	+0.002	P=0.992 Not Significant
Urinary Microalbumin & Serum Creatinine	+0.268	P=0.060 Not Significant

Discussion:

Strokes have recently emerged as a major health problem affecting the population. Its incidence has increased many folds with the emergence of several risk factors like coronary artery diseases, diabetes mellitus, hypertension, dyslipidemia. Hypertension and amyloid angiopathy are the primary causes while coagulopathy, trauma, intracranial neoplasm; drugs are the secondary causes for intracranial haemorrhage[4]. A large prospective study has reported

that microalbuminuria is a risk factor for stroke in men, and a limited case-control study[7] found that the highest quintile of microalbuminuria values was associated with a 13- fold increased risk for stroke. Although microalbuminuria is more prevalent in diabetes and/or hypertension, 2 classic risk factors associated with intracranial arteriosclerosis, reduced microvascular perfusion, and lacunar infarcts, there is scant data regarding the incidence of microalbuminuria in lacunar stroke. The present study was done in the Medicine and Neurology department of Chittagong medical College Hospital. Among 50 patients of intracerebral hemorrhage we evaluate urinary microalbumin. In the present study, male was more than female as expected, as male got more preference to female in the present socioeconomic and social status of Bangladesh. In a similar study, it was observed that among 46 patient, male patient was 32(69.6%) and female was 14(34.6%)[9]. Different types of occupation were found in the study patients but maximum were doing nonspecific works. Patients from middle class and poor families were more in the present study. This may be due to reason that they cannot afford the costly treatment in private hospital. Sedentary workers and patients from urban community are more common in the present study. Among the study patients, hypertension was found among 50 (71.42%) patients. Present study is comparable to the study done at other part of Bangladesh[10], where out of 500 stroke cases, 72% patients were known hypertensive. This study was conducted to analyze the relationship between Microalbuminuria and stroke. Present study shows that among 50 study patients, ischaemic stroke was 30 (12.8%) and rest 20 (87.2%) were Hemorrhagic stroke. Mean of urine for Microalbumin level of Ishaemic stroke was and Mean of urine for Microalbumin level of Hemorrhagic stroke was this finding was comparable[11,12]. This is a single-center hospital study and the results may or may not reflect the cross section of the population. For more consistent results large multi-center studies have to planned and executed in order to determine relationship between blood volume and mortality rate. This study limitations include a single early morning spot urine sample was tested for MA for cost effectiveness, while current guidelines require at least two of three specimens fall within the microalbumin range in order to label as MA.

Conclusion:

We found high frequency of microalbuminuria in patients with stroke Therefore; microalbuminuria could be is a useful modifiable factor, in addition to conventional risk factors, in identifying those at increased risk of stroke.

Conflict of Interest: None.

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