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ORIGINAL ARTICLE

To Study the Frequency of Albuminuria in Diabetics Brought in with Stroke: A survey at Tertiary Care Hospital, Lahore

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ABSTRACT

Background: Albuminuria is thought to be a separate risk factor for stroke. A strong association between diabetes related albuminuria and stroke has been published in the international literature. Albuminuria being a sign of endothelial dysfunction, atherosclerosis is a strong predictor of strokes.
Aim: To investigate the albuminuria as a predictor of stroke in diabetics in our population.
Study design: Observational study.
Place and duration of study: This study was done in the Department of Neurology, Sharif Medical & Dental College/Hospital, Lahore from January to August 2019.
Methodology: One hundred and fifty diabetic patients having ages 25 to 75 years presented with stroke were enrolled in this study. Demographics (age, sex, residence and socio-economic status) of the included population and types of stroke were recorded on study proforma after getting brain CT of each patient. Urine for albuminuria was examined under microscope.
Results: In this study (63%) were males and 37% were females with M:F ratio 2.54:1. Major portion of the patients (43%) were ages between 25-45 years mean±SD 51.62±8.45. Ischemic stroke was found in 114 (76%) hemorrhagic in 24(16%) and undetermined in 12(8%) patients respectively. Albuminuria was found in 72(48%) patients, Group A 40(69%) had ischemic stroke, 10(17%) had hemorrhagic and 8(14%) had undetermined stroke.
Conclusion: It is concluded that is strong relation between microvascular complications with macrovascular complication of diabetes (i.e. albuminuria with stroke). The stoke patients with diabetes has more frequency of albuminuria as compared to non diabetics.
Keywords: Albuminuria, T2DM, Stroke, Hemorrhagic.

INTRODUCTION

Diabetes is a syndrome with protean manifestations involving all systems as complication in 2031 the estimated diabetic world population would be around 7.7%.[1] Pakistan being one of the most affected country. The incidence is 6 to 6.9% among males and 2.5 to 3.5% in females.[2] Diabetes is notorious to cause macrovascular complications e.g. Ischemic heart disease, cerebrovascular disease and lower extremity arterial disease (LEAD) and micro-vascular complications e.g. eye disease, kidney disease and neuropathies[3].

The association between stroke and diabetes is bidirectional or consangious. There is definitely a causal association between type 2 diabetes and cerebral small vessel disease (CSVD) is increasingly recognized as a risk factor for stroke and vascular dementia, with diabetes considered an important potentially modifiable risk factor.[4,5.6] Type 2 diabetics have 7% prevalence of CVEs and 200-300% risk of fatal stroke[7] and Type 1 diabetics are atrisk of hemorrhagic stroke. as compared to non-diabetics[7,8].

Similarly, the prevalence of impaired glucose tolerance and diabetes in patients brought with acute stroke is upto 28%[9]. This is associated with poor stroke outcomes and mortality because of worsening renal function ofeither variety of stroke[10-12].

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Endothelial cell dysfunction is the main vascularinsult leading to stroke in diabetes mellitus[13]. Asalbuminuria is a predictor of endothelial dysfunction so its high levels are associated with cerebrovascular event[14]. As diabetic nephropathy presentnts as sole albuminuria in 1/3rd of diabetics, means that the patients with early kidney disease (albuminuria) have significant risk of stroke[15]. The current study was done to see the association of albuminuria with stroke in patients with diabetes in our set up.

PATIENTS AND METHODS

After written informed consent from patients or near relatives 150 diabetic patients with >5 years history of type 2 diabetes and had been brought with new onset of stroke were enrolled in the study demographic factors (age, sex, drugs socioeconomic status) were included in the study proforma. The following 2 tests were done on each patient: CT brain & albuminuria, CT brain plain. Study was approved by the Ethical Committee.

Patients were divided into 2 categories as per reporting by radiologist

A. Non-hemorrhagic stroke: patients were divided into
(i) Ischemic stroke: when CT had clear evidence of ischemia in either of the 3 territories
(ii) Undetermined stroke: when ischemia was not evident on CT brain and
B. Hemorrhagic stroke: when hemorrhage was evident on CT brain

1) Spot urine to look for albuminuria (under microscope)

RESULTS

Major portion of the patients 65 (43%) were ages 25-45 years (Table 1). In this study (63%) were males and 37% were females patients (Table 2). Non hemorrhagic stroke: Ischemic stroke was found in 114 (76%), 12 (8%) patients had stroke of undetermined etiology, while hemorrhagic was present in 24 patients (16%). On the basis of Albuminuria patients were divided into 2 groups: 48% patients had positive albuminuria Group A and those with no albuminuria Group B: comprised 52%. Amongst Group A: 69% had ischemic stroke, 14% had stroke of undetermined variety and 17% had hemorrhage on CT. Table 3 explains relation of stroke with presence or absence of albuminuria. A Chi-square test with p value of less than 0.05 is significant.

Table 1: Age distribution of patients (n=150)

Age (years)	No.	%
25-45	65	43.0
46-65	51	34.0
>65	34	23.0
Mean±SD	51.62±8.45	

Table 2: Gender distribution of patients (n=150)

Gender	No.	%
Male	94	63.0
Female	56	37.0
M:F ratio	2.54:1	

Table 3: Relation between albuminuria with stroke types

Category/ Stroke	Albuminuria		
	Group A Present	Group B Absent	Total
Ischemic	50(69%)	64(82%)	114(76%)
Undetermined	10(14%)	2 (02%)	12(8%)
Hemorrhagic	12(17%)	12(15%)	24(16%)
Total	72(48%)	78(52%)	150

Chi-square = 0.12 which has p value <0.005 at df =1

DISCUSSION

As the incidence of diabetes is increasing day by day in all races and age groups especially in young adults. The macro-vascular disease is the most common cause of morbidity and mortality in the younger age group (>75%) due to many reasons.[16,17] Through this observational study we found out that the incidence of stroke was more among the early age diabetics as compared to older population; 43% population was of less than 45 years and only 23% were >65 years of age.

Our findings are in concordant with those published in international literature. In 2 studies published elsewhere by Mahar[18] et al and Jadoon et al[19] most of the patients were in the younger age groups (41-50 years) of age i.e. 36.73%

In our study, frequency of albuminuria in diabetics presenting with stroke was 52(35.37%) while 95(64.63%) had no findings of the morbidity, findings are concordant with study results of Nakamura[8] (>42%)[19].

In a study published by Agaba et al, microalbuminuria was 49.2% of the patients. They concluded that this microalbuminuria was associated with MAP (mean arterial pressure) secondary hypertension and diabetic eye disease espretinopathy (P<0.05). Interestingly this microalbuminuria was more common in newly diagnosed. Diabetics thus highlighting the importance of evaluation of all diabetics for microalbuminuria[20].

In our study males were affected more than 2 times their sex counterparts ratio of 2.54:1, this male to female ration is different that study by Jadon et al[19] found that frequency of albuminuria among diabetic patients presenting with stroke was 35.37%. 59.62% were males and 40.38% were females. The 73% of participants were less than 50 years and 26.93% were above 51 years of age. This discordant finding may be explained by different socio-economy, geographical and variable genetic heterogenetic factors. Albuminuria is considered as important risk factor for atherosclerosis, IHD and other vasculopathies in diabetics[21,22].

Both microvascular complications of diabetes i.e. nephropathy and retinopathy are strongly associated with each other. If we find one entity in a diabetic, the patient should be screened for the other one too. Both of these alone or together have strong association with macrovascular complications attributed to diabetes. There is convincing evidence about association between diabetic nephropathy, neuropathy and coronary artery disease (CAD) and lower extremity arterial disease (LEAD)[23]. Albuminuria is hall mark of nephropathy. It is an indicator of endothelial cell dysfunction and inflammation both of these bridge between macro and microvascular complications of diabetes mellitus. Albuminuria was present in 69% of ischemic stroke and 17% hemorrhagic 14% of undetermined stroke in our study these findings are matching with those published internationally

Albuminuria was proven a strongly risk factor for stroke, according to a collaborative research done on >45 thousand participants with around 1500 stroke. But it was not clear whether there is linear relationship between albuminuria and stroke events.[22,24,25]. Many other studies hilighted that Albuminuria was present in about 1/3rd of the diabetics and is an important risk factor for atherosclerosis, CAD and other vasculopathies related to diabetes.[11] People of Asian ascent also have close association between microvascular complication (albuminuria) and macrovascular complications like CAD and stroke[22,23].

Our study highlights that 16% of hemorrhagic strokes have co-existent albuminuria. This association is 1/4th time less as with ischemic stroke. This is matching with the studies published in international literature Aguilar et al concluded that even low level of albuminuria isrisk factor forhemorrhagic stroke[26].

Danziger studied the importance of low-grade albuminuria in relation to hemorrhagic stroke. They concluded that small increments in UACR at levels 30 are associated with increased risk of vascular disease especially hemorrhagic stroke most likely because of co-existent of hypertension[26,27].

CONCLUSION

There is strong relation between microvascular complications with macrovascular complication of diabetes (i.e. albuminuria with stroke). The routine screening of each

diabetic for albuminuria should be in practice to fore see and prevent from divastating disability related to stroke.
Conflict of interest: None

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