ALBUMINURIA IN DIABETIC PATIENTS WITH STROKE.

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ABSTRACT

Background: Diabetes is a major health burden worldwide. There is a close association between albuminuria and development of stroke in diabetics. This study was conducted to determine the frequency of albuminuria among diabetic patients presenting with stroke

Methodology: This descriptive cross-sectional study was conducted in the department of Medicine, DHQ Teaching Hospital, Abbottabad, from 15th April to 15th October, 2017. All diabetic patients of either gender above age 20 who were admitted with stroke were included in the study on the basis on non-probability consecutive sampling. The data was collected through a structured pro forma and analysed using SPSS-16.

Results: A total of 147 cases fulfilling the inclusion and exclusion criteria were enrolled, among them 93(63.27%) were males and 54(36.73%) were females. Majority of the patients 54(36.73%) were between 41-50 years. Frequency of albuminuria among diabetic patients presenting with stroke was 35.37%(n=52).

Conclusion: The frequency of albuminuria is high among diabetic patients presenting with stroke. It is recommended that every diabetic patient should be routinely screened for albuminuria to prevent the disabling complication.

Key words: Diabetes mellitus, stroke, albuminuria.

INTRODUCTION: Diabetes is causing burden on all health care systems around the world. It is estimated that global prevalence of diabetes in 2010 was 6.4%, affecting about 285 million adults, and will increase to 7.7% in 2030 affecting about 439 million adults.1 Prevalence of diabetes in Pakistan is 6 to 6.9% among males and 2.5 to 3.5% in females in different areas.[2]

Diabetes causes several vascular complications in patients categorized as macro and micro-vascular disorders. Common macrovascular problems include myocardial infarction, peripheral arterial diseases and stroke, whereas microvascular problems result in neuropathy, nephropathy and retinopathy.3 Prevalence of cerebrovascular disease in diabetics is 7% having 2-3 times increased risk of fatal stroke as compared to general population.[4]

Endothelial cell dysfunction and inflammation are key contributors to the development of stroke in diabetes mellitus.5 As albuminuria is considered a sign of endothelial dysfunction, and sub-clinical atherosclerosis, so presence of albuminuria is considered an important predictor of stroke.6 Diabetic nephropathy presenting as albuminuria is common in diabetics (about 34%), thus highlighting the increased risk of developing stroke.[7]

Close association between albuminuria and macrovascular complication like stroke has been reported in diabetic patients of Indian subcontinent.8 The incidence of stroke varies with the level of albuminuria in diabetics. The higher urinary albumin excretion is associated with increased risk of developing stroke. The role of albuminuria as a predictor of stroke in diabetics need further studies to

strengthen this association.[9]

MATERIALS AND METHODS

This was a hospital based descriptive cross-sectional study. 147 patients were included in the study that were admitted in the Department of Medicine, DHQ Teaching Hospital, Abbottabad, during the six months period from 15th April to 15th October 2017 and were diagnosed with stroke and were diabetic.

Sample size was calculated using the WHO software to calculate the sample size taking confidence Level (1-α) at 95%, absolute precision 10, frequency of albuminuria in diabetic patients with stroke was kept as 42.1%.10 Sample Size (n) came out to be 147. The sampling technique was nonprobability consecutive. The patients were of age 20 and above and either gender.

Prior approval from hospital ethical committee was taken. Use of data for research and publication was explained to the patients and/or their relatives, and informed consent was taken.
All patients fulfilling the inclusion criteria that have their diagnosis of stroke confirmed by neuroimaging (CT Scan or MRI) were included in the study.

Detailed history from the patients was taken and a complete physical examination was performed. Laboratory tests such as FBC, LFTs, renal profile, ultrasound abdomen and ECG was performed in all patients, included in the study, 24 hour urine collections was done by using a graduated standard jar and sent after 24 completed hours to detect albuminuria. The patients with previous history of hypertension, smoking, valvular heart disease, atrial fibrillation, chronic renal failure and cirrhosis found on interview, physical examination or investigations were excluded from the study.

All the data was collected on a pre-designed proforma. Data was entered and analysed using SPSS-16. Continuous variables (e.g. age, 24 hours urinary albumin excretion) were described in terms of Mean and Standard Deviation. Frequencies and percentages were calculated for categorical variables like gender and Albuminuria. Albuminuria level was stratified among age and gender to see the effect modifications. All results were presented in the form of tables and graphs. Appearance of >30mg of albumin measured by 24 hour urinary protein in hospital laboratory was considered significant.

RESULTS

A total of 147 diabetic patients with stroke were included in this study. There were 93 (63.27%) males and 54(36.73%) females.

Seventeen of the patients were between 20-30 years (11.56%), while 19.73%(29) between 31-40 years, 36.73%(n=54) between 41-50 years, and 31.98%(n=47) between 51-60 years. The mean age was 43.65+4.24 years.

Frequency of albuminuria among diabetic patients presenting with stroke was 35.37%(n=52) (Table 1). 59.62%(31) of these 52 patients were males and 40.38%(21) were females (Figure 1). Out of these 52 cases 4 (7.69%) were between 20-30 years, 11(21.15%) between 31-40 years, 23(44.23%) between 41-50 years, and 14(26.93%) between 51-60 years of age. (Figure 2)

Albuminuria among diabetic patients with stroke	No. of patients	Percentage
Yes	52	35.37
No	95	64.63
Total	**147**	**100**

Table 1: Frequency of albuminuria among diabetic patients presenting with stroke.

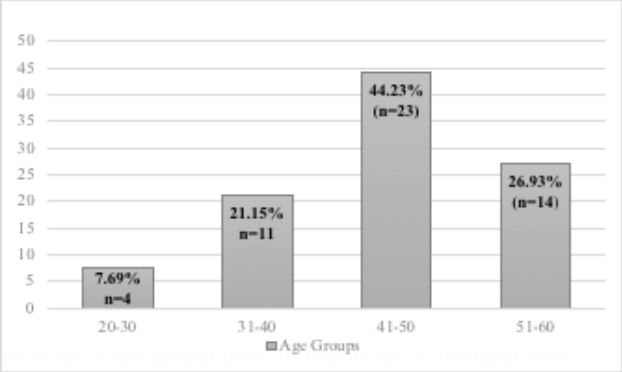

Figure 1: Frequency of albuminuria among diabetic patients presenting with stroke in age groups.

DISCUSSION

Diabetes mellitus is becoming a major contributor of morbidity and mortality in Pakistan. World Health Organization in its report shows that Pakistan has 5.2 million diabetic subjects, and the number is expected

to increase to a staggering 13.9 million making it the 5th highest in the world by 2030.[11]

The recognition of frequency of microalbuminuria among diabetics presenting with stroke in our society was required so that we may timely manage the disease course, set a regular follow up criteria and save our patients from the morbidity.

Most of the patients in our study were between 41-50 years of age i.e. 36.73%. These figures are in agreement with a study at Karachi with regards to prevalence of type II diabetes mellitus and diabetic retinopathy, which shows 58.32% of the patients between 30-40 years and the mean age was recorded as 42 years.[12]

In our study, frequency of albuminuria among diabetic patients presenting with stroke was 35.37%(n=52) while 64.63%(n=95) had no findings of the morbidity, these findings are in agreement with Nakamura T10 who recorded these figures as 42.1%.

Agaba EI and coworkers investigated the prevalence of microalbuminuria in newly diagnosed type 2 diabetic patients and its clinical correlation and found microalbuminuria present in 32(49.2%) of the patients, and was significantly associated with mean arterial pressure, systemic hypertension and diabetic retinopathy ($P < 0.05$). Microalbuminuria is common in newly diagnosed patients with type 2 diabetes mellitus and suggested that routine screening for microalbuminuria as part of the initial evaluation of these patients.[13]

Microalbuminuria is common among patients with cerebrovascular disease and correlates with an increased stroke risk even after correction for confounding clinical risk factors. In the European Prospective Investigation into Cancer in Norfolk population, microalbuminuria was independently associated with a 50% increased risk for stroke (hazard ratio [HR] 1.49; 95% CI 1.13 to 2.14); the association with macroalbuminuria was even greater (HR 2.43; 95% CI 1.11 to 6.26).14 In addition, a 15.5 year cohort study that examined stroke risk factors in Japan showed that urinary albumin was an independent risk factor for stroke in men (RR 2.5; 95% CI 1.1 to 5.7) but not in women.[15]

An association between microalbuminuria and recurrent stroke has also been reported. Among a population of older (median age 65 years) Americans with previous ischemic stroke or transient ischemic attack, microalbuminuria independently predicted future stroke (HR 4.9; 95% CI 1.4 to 17.6; $P < 0.01$ versus patients with normoalbuminuria).[16]

Other reported cerebrovascular clinical correlates with microalbuminuria include cerebral ischemic lacunae, middle cerebral artery stenosis, impaired carotid arterial blood flow and vasomotor reactivity on Doppler ultrasonography, and increased carotid artery intima-media thickness. In addition, patients who have had an acute stroke and have microalbuminuria have a poorer outcome than those without microalbuminuria.[17]

Close association between albuminuria and macrovascular complication like stroke has been reported in diabetic patients of Indian subcontinent also.8 The incidence of stroke varies with the level of albuminuria in diabetics. The higher urinary albumin excretion is associated with increased risk of developing stroke.[9]

CONCLUSION

The frequency of albuminuria is high among diabetic patients presenting with stroke. Every patient who present with stroke with diabetes, should be checked out for albuminuria. It is also recommended that every diabetic patient should be routinely screened for albuminuria to prevent the disabling complication.

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