



Research Article

Assessment of Urine Protein & Urine Creatinine in severe acute stroke patients with complications of type-2 diabetes and hypertension

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Abstract

Background: Stroke is a complex stage in patients of uncontrolled type-2 diabetes and hypertensive patients. Urine Protein and Urinary Creatinine may be a predictor in stroke patients? On this view; this study has been carried out.

Objectives: Find out Urine Protein and Urinary Creatinine in the patients of severe acute stroke with complication of type-2 DM and hypertension.

Introduction: Stroke is caused by the interruption of the blood supply to the brain, usually because a blood vessel bursts or is blocked by a clot. This cuts off the supply of oxygen and nutrients, causing damage to the brain tissue. Strokes in diabetic and hypertensive patients are due to occlusion of small paramedial penetrating arteries. It is the third major cause of death after heart disease and cancer in the world.

Material and Methods: The present study comprised 500 Subjects (250 cases and 250 controls). 250 acute stroke patients with diabetes non-hypertensive (N=125) and with hypertension non-diabetic (N=125) recruited from the IPD of NIMS Hospital were selected as cases. 250 healthy age and sex-matched subjects were selected as controls. Adults suffering from Stroke were included and surgical patient, pregnant women were excluded. Estimation urinary protein was done by the pyrogallor red colorimetric method. Estimation of urinary creatinine was done by Jaffe's alkaline picrate method. Statistical analysis was performed using Microsoft Excel 2007. Data was expressed as mean±SD. Individual groups were compared (significance of difference) using Student's unpaired t-test.

Results: Urine Protein was found elevated at high significant level while Urine Creatinine was not found significant in stroke with complication of type-2 diabetes mellitus and hypertensive subjects.

Conclusion: Our prospective hospital based study gives evidence that beside hypertension and hyperglycemia, Urine Protein may assumed as clinical predictor in patients of severe acute stroke with long duration uncontrolled hypertension and hyperglycemia.

Keywords: Urinary Protein, Urinary Creatinine, Stroke.

Introduction

Strokes in diabetic and hypertensive patients are due to occlusion of small paramedial penetrating

arteries. The occlusions cause small infarcts within the white matter of the brain. Diabetic autonomic neuropathy may contribute to the

development of cerebrovascular disease in people with diabetes.¹ Stroke is caused by the interruption of the blood supply to the brain, usually because a blood vessel bursts or is blocked by a clot. This cuts off the supply of oxygen and nutrients, causing damage to the brain tissue². Stroke is the third major cause of death after heart disease and cancer³. For most cause of disability all over the world. Cerebral ischemia is caused by a reduction in blood flow that lasts longer than several seconds. Neurologic symptoms are manifest within seconds because neurons lack glycogen, and thus energy failure is rapid⁴.

Material and Methods

The present Study was carried out in the department of biochemistry at National Institute of Medical Sciences and Research, Jaipur, Rajasthan. 500 Subjects (250 cases and 250 controls) were enrolled in this study. 250 acute stroke patients with diabetes (N=125) and with hypertension (N=125) recruited from the IPD of NIMS Hospital were selected as cases. 250 healthy age and sex-matched subjects were selected as controls.

Inclusion Criteria: Adults suffering from Stroke with the complication of hyperglycemia and hypertension.

Exclusion Criteria: Surgical Patient, Pregnant women.

Age, sex, blood pressure, was recorded. Each case was subjected to a detailed history and clinical examination using the prescribed proforma. Past history and family history of hypertension was enquired particularly. Detailed clinical examination was done with particular stress on blood pressure.

Diabetes Mellitus Type-2 (DM type-2): DM type-2 was simply identified by maternal and paternal disease history and conformed by testing

overnight fasting plasma glucose which was found exceeded from 160 mg/dl.

Hypertension: Hypertensive patients were identified >130/85 mm of Hg.

Estimation of total urinary protein [Orsonneau, 2001]⁵ pyrogallol red colorimetric method [Kits provided by Reactivos GPL, Barcelona. Analysis was done on semi-autoanalyser (Mindray BA-88A diagnostics)]: Urinary protein was measured spectrophotometrically by the reaction of protein present in the urine with pyrogallol red and molybdate to form a coloured complex. The intensity of the colour was read.

Estimation of urinary creatinine, [murray, 1984]⁶ Jaffe's alkaline picrate method [Kits provided by Reactivos GPL, Barcelona. Analysis was done on semi-autoanalyser (Mindray BA-88A diagnostics)]: The assay is based upon the reaction of creatinine with the sodium picrate as described by Jaffe. Creatinine reacts with alkaline picrate forming a red complex. The time interval chosen for measurements causes avoids interferences from other serum constituents. The intensity of colour formed is proportional to the creatinine concentration in sample.

Statistical analysis was performed using Microsoft Excel 2007. Data was expressed as Mean±SD. Individual groups were compared (significance of difference) using t-test. P<0.001 is significant.

Result

Age of patients was 52.64±16.11 years; most of them were in middle age. While controls were nearly fifty years (Mean age 48.2±11.57 years) (Table-1). Urine creatinine concentration in stroke patients was not significantly different than in normal subjects (Table-2). Comparison of urine protein between the two groups showed that urine protein was significantly higher in the stroke patients than in normal subjects (Table-3).

Table-1: Comparison of age of stroke and control group.

Parameters	Control	Stroke	P-value limit	Actual P-value	Sig.
AGE (Years)	48.2±11.57	52.64±16.11	>0.001	0.3672	NS

Table-2: Comparison of UP, UC, and RPS of non hypertensive diabetic patients and controls.

Parameters (mg/dl)		Control N/2 (mean ± SD)	Stroke N/2 (mean ± SD)	Actual P-value	Sig.
Both Sexes (N=250)	RPG	99.12±16.06	240±24.46	0.0001	HS
	UC	75.3±26.27	67.12±33.25	0.4319	NS
	UP	17±3.04	133.56±46.99	0.0001	HS
Females (N=80)	RPG	98.75 ± 11.71	225.71 ± 18.28	0.0001	HS
	UC	75.31 ± 39.54	60.05 ± 28.41	0.3903	NS
	UP	17.42 ± 3.26	125.37 ± 49.30	0.0001	HS
Males (N=170)	RPG	99.29 ± 13.71	246.68 ± 22.51	0.0001	HS
	UC	75.29 ± 41.92	70.23 ± 36.95	0.713	NS
	UP	16.78 ± 44.83	137.41 ± 87.52	0.0001	HS

RPG-Random Plasma Glucose, UC-Urine Creatinine, UP-Urine Protein, HS-highly significant, NS-No significant

Table-3: Comparison of UP, UC, and BP in non-diabetic patients and controls.

Parameters (mg/dl)		Control N/2 (mean ± SD)	Stroke N/2 (mean ± SD)	Actual P-value	Sig.
Both Sexes (N=250)	SBP	121.68±616	146.96±16.0	0.0001	HS
	DBP	80.56±4.33	84.28±9.79	0.2568	NS
	UC	61.42±17.63	67.12±34.11	0.3564	NS
	UP	15.82±18.5	133.56±47.15	0.0001	HS
Females (N=80)	SBP	120.5±6.03	147.5±17.56	0.0001	HS
	DBP	79.25±3.01	88.62±6.13	0.0001	HS
	UC	57.93±18.04	60.05±28.41	0.2341	NS
	UP	16.27±2.83	125.37±49.30	0.0001	HS
Males (N=170)	SBP	122.23±6.36	146.70±15.63	0.0001	HS
	DBP	81.17±4.94	82.23 ±10.86	0.0721	NS
	UC	63.05±17.74	70.23±36.95	0.0621	NS
	UP	15.60±3.55	137.41±87.52	0.0002	HS

SBP-Systolic Blood pressure, DBP-Diastolic blood pressure, UC-Urine Creatinine, UP-Urine Protein

Discussion

Diabetes is a risk factor for various micro vascular complications such as retinopathy, neuropathy, cardiovascular disease and nephropathy and stroke. The study showed a non-significant difference in urine creatinine. Urine protein was found high significant when compared to control group. In several studies, it has been reported that there is a correlation between type 2 diabetic mellitus patients and stroke⁷. Persistent diabetes is a strong predictor of development of clinical stroke, which is reversible, but may lead to some time brain damage and death if neglected. Therefore, early diagnosis may help to prevent of progression of diabetes. In the present study, the mean urinary creatinine concentration in stroke patients was 67.12±33.25 mg/dl and in control group; it was 75.3±26.27 mg/dl. The difference was not significant with a P>0.001 (P-value of 0.4319). The mean urine protein concentration was 133.56±46.99 mg/dl in diabetic test group and

in control group; it was 17.0±3.04 mg/dl. Comparison of the urine protein between the two groups showed that urine protein was higher in the stroke patients and the difference was statistically significant with a P<0.001 (P-value of 0.0001) (Table-2). The mean urine protein concentration which was found in stroke patients with hypertensive was 133.56±47.15 mg/dl and in control group; it was 15.82±18.5 mg/dl. Comparison of the urine protein between the two groups showed that urine protein was higher in the stroke patients and the difference was statistically significant with a P<0.001 (P-value of 0.0001) (Table-3). Although some investigators advocate the total protein measurement in stroke patient and have suggested that the excretion of urine protein increases in Stroke patient than normal⁸. Dawson et. al. found that comparison of the urine protein between the two groups showed that urine protein was higher in the stroke patients and the difference was statistically significant with a p-

value of $<0.001^9$. Thus, the increase in urine protein in diabetic patients suffering from stroke is in conformity with an earlier study.¹⁰

Conclusion

Our prospective hospital based study gives evidence that beside hypertension and hyperglycemia, Urine Protein may assumed as clinical predictor in patients of severe acute stroke with long duration uncontrolled hypertension and hyperglycemia.

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