



AN OBSERVATIONAL STUDY ON METABOLIC SYNDROME IN PATIENTS WITH STROKE

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ABSTRACT

OBJECTIVES: This study was conducted to study the prevalence of metabolic syndrome and its various components in patients with stroke.

Material And Methods: A total of 50 patients with stroke were included in the study. Detailed history, physical examination and necessary investigations were undertaken. Waist and hip circumferences, optic fundoscopic examination for hypertensive or diabetic changes and atleast three blood pressure measurements were recorded.

Results: In this observational study of 50 patients, the prevalence of metabolic syndrome was found to be 40% which was most prevalent in the age group of 41-50 years (50%). Prevalence of metabolic syndrome in stroke was significantly higher in females as compared to males (p value 0.001). Diabetes and hypertension being the most common risk factors in stroke patients with and without metabolic syndrome with no significant difference. The difference was statistically significant for waist circumference (p value <0.001) and reduced HDL (p value=0.04)

Conclusion: Metabolic syndrome is highly prevalent in stroke patients. Early diagnosis and treatment of the metabolic syndrome may reduce the development of cerebrovascular diseases and its complications.

KEYWORDS : Metabolic syndrome, Stroke.

INTRODUCTION

World Health Organisation defined stroke as "rapidly developing clinical signs of focal or global disturbance of cerebral function, lasting more than 24 hours or leading to death, with no apparent cause other than vascular origin"⁽¹⁾. Stroke is a major global public health problem. According to the Global Burden of Diseases (GBD) study in 1990, stroke was the second leading cause of death worldwide⁽²⁾. According to the India stroke factsheet updated in 2012, the estimated age-adjusted prevalence rate for stroke ranges between 84/100,000 and 262/100,000 in rural and between 334/100,000 and 424/100,000 in urban areas⁽³⁾.

Stroke has multiple modifiable and non modifiable risk factors out of which Diabetes, hypertension, obesity, dyslipidemia and smoking are the most prevalent ones. The metabolic syndrome refers to the co-occurrence of several known cardiovascular risk factors, including insulin resistance, obesity, dyslipidemia and hypertension. It identifies a subgroup of patients with shared pathophysiology who are at high risk of developing cardiovascular disease and type 2 diabetes⁽⁴⁾. Metabolic syndrome is associated with an increase risk of acute stroke in subjects with significant contributions from its individual components.

High prevalence of obesity and insulin resistance in urban Indian population is well known. A study from Chennai report 18.7% prevalence of metabolic syndrome in upper socio-economic strata in South India, while it was 6.5% in the low socio-economic strata. Higher prevalence of metabolic syndrome in women as compared with men is seen in urban south Indian population⁽⁵⁾. The association between metabolic syndrome and stroke has been confirmed in populations integrated by elderly subjects, and the frequency of metabolic syndrome has been reported to be significantly higher in patients with a history of atherothrombotic or nonembolic ischemic stroke⁽⁶⁾.

The metabolic syndrome is unfortunately a rampant condition and the syndrome may represent an independent risk factor above and beyond its components that will necessitate aggressive behavioural and possibly pharmacologic management geared at averting future stroke events. This observational study was hence conducted to study the prevalence of metabolic syndrome and its various components in patients with stroke.

MATERIALS AND METHODS

This descriptive study was carried out over a period of 12 months, 50

patients with stroke were recruited for the study after taking informed consent.

Inclusion Criteria

1. Both male and female patients presenting with neuroradiological features of stroke (clinically and ct scan proven including major and minor stroke).
2. The patients with age more than 30 years and less than 60 years.

Exclusion Criteria

1. Patients with age less than 30 years and more than 60 years
2. Neurological deficit not fitting into above clinical/radiological criteria for stroke.

Data collected using a pretested proforma meeting the objectives of the study. Detailed history, physical examination and necessary investigations were undertaken. Waist and hip circumferences were measured; optic fundoscopic examination for hypertensive or diabetic changes, cardiovascular, respiratory, abdominal and CNS examination was done. Atleast three blood pressure measurements with same standard mercury sphygmomanometer and Littman's stethoscope in supine position were taken.

Metabolic syndrome was diagnosed by ATP III Definition (3 of 5 risk factors)

Waist circumference: >102 cm (40 inches) for men and >88 cm (35 inches) for women

Blood pressure: ≥ 130 mm Hg systolic and / or ≥ 85 mm Hg diastolic
Fasting glucose: ≥ 110 mg/dl or 6.1 mmol/l
Triglycerides: ≥ 150 mg/dl or 1.69 mmol/l

High-density-lipoprotein-cholesterol: <40 mg/dl in men and <50 mg/dl in women

RESULTS

In the present study, the prevalence of metabolic syndrome was found to be 40% (20/50 cases). Maximum stroke patients belonged to the age group 51-60 years (46%), however metabolic syndrome was found to be most prevalent in the age group of 41-50 years (50%). Overall all number of males with stroke was higher as compared to females with male to female ratio of 2.1:1; on the other hand prevalence of metabolic syndrome in stroke was significantly higher in females as compared to males (p value 0.001).

In our study most common mode of presentation of stroke in both with metabolic syndrome and without metabolic syndrome was weakness. Weakness was followed by slurring of speech, loss of consciousness, deviation of angle of mouth in that order of frequency in stroke with metabolic syndrome group. In stroke without metabolic syndrome group the order of frequency was weakness, slurring of speech, deviation of angle of mouth, loss of consciousness. Other modes of presentation were headache, vomiting, giddiness and seizure. Weakness as a mode of presentation was significantly more common in stroke without metabolic syndrome group, (P value-0.02). Loss of consciousness as a mode of presentation was significantly more common in stroke with metabolic syndrome group (p value-0.03). The difference was not statistically significant for other modes of presentation.

Diabetes and hypertension being the most common risk factors were present in 95%, 75% and 76.7%, 73% in stroke patients with and without metabolic syndrome. The difference was however statistically insignificant. On the contrary smoking was significantly associated with stroke without metabolic syndrome (p value 0.02). In our study, all components were more common in stroke with metabolic syndrome group than in stroke without metabolic syndrome group. The difference was statistically significant for components, waist circumference (p value-<0.001) and reduced HDL (p value-0.04). In stroke with metabolic syndrome group, components were more common in females than in males (table 1a & b).

DISCUSSION

The Metabolic syndrome is a clustering of risk factors of metabolic origin that are together associated with higher risk of cerebrovascular disease it is associated with an increase in risk of C.V. Stroke with significant contributions from its individual components.

Prevalence of metabolic syndrome in stroke patients in the present study was 40% which is comparable to other studies like the one done by Boden Albala et al.⁷ (44%) and Simon Cronin et al.⁸ (40%). In our study, prevalence of metabolic syndrome in stroke was more in age group 41-50 years. In present study & in studies conducted by Boden-Albala et al.⁷ (62%) and Rodriguez-Colon et al.⁹ (55%) females predominated in stroke with metabolic syndrome group.

Table-1a & b: Components of Metabolic syndrome

Components	Stroke with Metabolic syndrome			Stroke without Metabolic syndrome		
	Males	Females	Total	Males	Females	Total
Waist circumference (cm) ≥90 for Males ≥80 for Females	9 (45%)	11 (55%)	20	-	-	-
TG ≥150mg/dl	4 (28.6%)	5 (35.7%)	9	5 (35.7%)	-	5
HDL (mg/dl) <40 for Males <50 for Females	5 (20%)	9 (36%)	14	9 (36%)	2 (8%)	11
FBS ≥100mg/dl*	8(19%)	11(26.2%)	19	21 (50%)	2(4.8%)	23
SBP ≥130mmHg &/OR DBP ≥86mmHg*	7 (18.9%)	8 (21.6%)	15	22 (59.5%)	-	22

Components	Stroke with Metabolic syndrome	Stroke without Metabolic syndrome	p-value
Waist Circumference (cm) ≥90 for Males ≥80 for Females	20(100%)	-	<0.001
TG ≥150 mg/dl	9(45%)	5(16.6%)	0.06
HDL mg/dl <40 for Males <50 for Females	14(70%)	11(36.7%)	0.04

FBS ≥100mg/dl*	19(95%)	23(76.7%)	0.18
SBP ≥130mmHg &/OR DBP ≥86mmHg*	15(75%)	22(73.3%)	0.84

In present study, Weakness, loss of consciousness, slurring of speech and deviation of mouth were common symptoms at time of presentation which were in concordance with other studies⁽⁷⁻⁹⁾.

Table 2: Comparison of risk factors with other studies

Study	Smoking	Alcohol	Family History	Diabetes	Hypertension
Rodriguez et al.	57%	60%	7%	52%	46%
Simon-Cronin et al.	-	-	-	50%	42%
Ashtari F et al. ¹⁰	52%	53%	8%	-	-
Yasunori niwa et al. ¹¹	56%	53%	3%	-	-
Present Study	15%	5%	10%	95%	75%

Table 3: Comparison of components of metabolic syndrome with other studies

Study	WC cm ≥90 for males ≥80 for females	TG ≥150 mg/dl	HDL mg/dl <50 for females <40 for males	FBS ≥100 mg/dl *	SBP ≥130mmHg &/OR DBP ≥86mmHg*
Simon-cronin et al.	61%	32%	37%	64%	59%
Rodriguez-colon et al.	70%	41%	50%	75%	67%
Bang OY et al. ¹²	52%	39%	20%	53%	40%
Present Study	100%	45%	70%	95%	75%

In present study, diabetes and hypertension were the most common risk factors where as smoking, alcohol were not observed to be major risk factors for stroke in patients with metabolic syndrome as compared to other studies where they were observed to be major risk factors. Presence of positive family history was comparable to other studies. In present study waist circumference, diabetes mellitus and HDL components were far more common as compared to other studies. Our study had a limitation in the form of smaller sample size. Further multicentric larger studies are required to thoroughly evaluate the correlation of metabolic syndrome with stroke.

CONCLUSION

The Metabolic syndrome is becoming an important public health concern. The constant modern changes in the human environment, behaviour, and lifestyle have contributed decisively to epidemic dimensions to the problem of Metabolic syndrome. Apparently healthy individuals with the Metabolic syndrome are at a markedly increased risk for stroke, major cardiovascular events and mortality from these conditions. Early diagnosis and treatment including lifestyle modification and prevention of the metabolic syndrome may reduce the development of cerebrovascular diseases and its complications. Hence there is need to develop strategies to control metabolic syndrome and its components.

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