Original Article

Cardiometabolic risk profile in cases of Acute Stroke.

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Abstract:

Aim: To study the cardiometabolic risk profile of acute stroke.

Material and Methods: This prospective crossectional study was carried out in Jawarhalal Nehru Medical College AVBR Hospital, which is a 1280 bedded tertiary care hospital situated in Wardha district of Central India. One hundred consecutive cases of acute cerebrovacsular episodes (diagnosed by classical clinical features and confirmed by neuroimaging) who were admitted in the Medicine Ward/ ICU were included in the study. MetS was diagnosed by modified NCEP ATP III criteria. Parameters of cardiometabolic risk factors were compared between stroke patients with metabolic syndrome and without metabolic syndrome.

Results: In this study, recurrent stroke occurred significantly in metabolic syndrome group (p<0.05). Individually all metabolic syndrome parameters were associated significantly in acute stroke patients irrespective of the nature of the stroke (ischaemic vs haemorrhagic). When ischaemic and haemorrhagic stroke were separately compared we found no statistically significant correlation between the cardiometabolic risk parameters, suggesting that all the risk factors are distributed equally in both forms of stroke.

Conclusion: As the frequency of metabolic syndrome in stroke patients is high. It is important to change the lifestyle in order to prevent cardiovascular diseases and stroke.

Keywords: stroke, metabolic syndrome, cardiovascular, cardiometabolic, ischaemia, haemorrhage

Introduction :

Cerebrovascular diseases are the leading causes of mortality and morbidity in men and women in industrialized countries. [1-3] It is the main reason of functional disability. Stroke is the most common reason of disability affects of more than 700 000 individuals and the third cause of death in the world per year. [2] The consequent post stroke neurologic sequelae remains persistent in 90% patients, one third of the patients suffer permanent disability. [1,2] Cognitive impairment and dementia are the most important post stroke phenomenas. [3] Hypertension together with age are leading risk factors for silent or symptomatic cerebrovascular disease. [4-6] The risk of cerebral hemorrhage in hypertensive patients is 3.9 times higher than in non-hypertensive individuals.

Dyslipidemia, hypertension and obesity are atherogenic risk factors frequently found in type 2 diabetes patients. All these add to the burden of risk factors for stroke. [7,8] Cigarette smoking is an independent predictor of cerebrovascular disease in both men and women. [9] Smokers have a relative risk of ischemic stroke of 1.92 times higher as compared to non-smokers. Relationships between dyslipidemia and stroke have not been consistently elucidated. [10]

Metabolic syndrome (MetS) is defined (modified NCEP- ATP III) as the presence of three or more of the following: (1) abdominal obesity as determined by waist circumference > 90 cm and > 80 cm for women; (2) triglycerides $\geq$ 150 mg/dL; (3) HDL cholesterol < 40 mg/dL for men and < 50 mg/dL for women; (4) systolic blood pressure $\geq$ 130 mm Hg and

diastolic blood pressure ≥ 85 mmHg; and (5) fasting glucose ≥ 110 mg/dL . The metabolic syndrome is a predictor of coronary heart disease, cardiovascular disease (which includes coronary heart disease and stroke) and all-cause mortality. Also, the risk of stroke is higher for patients presenting some of the diseases included in the metabolic syndrome. [11] In one study the age-standardized prevalence rates of metabolic syndrome in india were 33.5% overall, 24.9 % in males and 42.3% in females. Older age, female gender, general obesity, inadequate fruit intake, hypercholesterolemia, and middle-to-high socioeconomic status significantly contributed to increased risk of metabolic syndrome. [12]

MetS is associated with different kind of diseases such as development of myocardial ischemia, ischemic stroke, extra and intracranial atherosclerotic, and asymptomatic carotid atherosclerotic plaques. [13-15] Some studies showed that lifestyle can affect on the MetS occurrence, so the risk of ischemic stroke decreases consequently by changing it. [16] This study was done to assess the cardiometabolic profile in acute stroke patients.

Aim:

To study the cardiometabolic risk profile of acute stroke .

Objectives:

1. To estimate the proportion/ frequency of modifiable risk factors in stroke patients

2. To estimate the proportion/ frequency of metabolic syndrome parameters in patients of acute stroke.

Materials and Methods :

This prospective crossectional study was carried out in Jawarhalal Nehru Medical College AVBR Hospital, which is a 1280 bedded tertiary care hospital situated in Wardha district of Central India. Duration of the study was 2 months. Ethical committee clearance was obtained before starting the study.

One hundred consecutive cases of acute cerebrovacsular episodes (diagnosed by classical clinical features and confirmed by neuroimaging) who were admitted in the Medicine Ward/ ICU were included in the study. Detailed history including family history, history of hypertension, diabetes, coronary artery disease, dyslipidaemia, alcoholism, smoking was taken.

Clinical examination and anthropometry (BMI, Waist circumference) was taken. Physical measurements were done by trained medical staff with standardized methods. The weight was measured by a digital scale, with minimum necessary clothing, and recorded to the nearest 0.5 kg. Height was measured in a standing position, without shoes, to the nearest 0.5 cm. BMI was calculated and recorded as weight in kg divided by height in meter squared. While the subjects were standing, WC was measured by a tape at a level midway between the lower rib margin and iliac crest. [17]

Appropriate investigations in form of FBS, Lipid Profile, ECG was done.

Exclusion criteria :

1. Patients not willing to participate

2. CVE patients in coma.

The metabolic syndrome was assessed by modified modified NCEP ATP III criteria. [18]

Statistical analysis ;

Statistical analysis was done by using descriptive and inferential statistics using Chi- Square test, Student 't' test and software used in analysis was SPSS 24.0 version and Graph Pad, p<0.05 was considered as significant.

Results :

Table 1 : **Baseline characteristics of Acute Stroke patients with and without Metabolic Syndrome** .

	Metabolic	Non Metabolic	Test value	p-value
Age(yrs)	55.93±10.31	55.66±14.96	0.09	0.92,NS
Age Range	29-72 yrs	17-87 yrs		
Gender				
Male	20	57	3.95	0.046,S
Female	11	12		
History				
Per Capita Income	3514.14±4008.75	2464.91±2121.38	5.21	0.004,S
Smoking	6(19.35%)	16(23.19%)	0.48	0.48,NS
Alcohol Abuse	9(29.03%)	23(33.33%)	0.37	0.54,NS
H/O Addiction	16(51.61%)	38(55.07%)	0.18	0.67,NS
Illicit Drug Use	0(0%)	1(1.45%)	1.00	0.31,NS
Previous Stroke/ Neurological Disease	6(19.35%)	6(8.70%)	4.15	0.041,S
Hypertension	26(83.87%)	22(31.88%)	55.50	0.0001,S
Dyslipidaemia	7(22.58%)	4(5.80%)	11.66	0.0006,S
DM	13(41.94%)	8(11.59%)	22.83	0.0001,S
CVS Profile				
Valvular Heart Disease	1(3.23%)	3(4.35%)	0.14	0.70,NS
Cardiomyopathy	0(0%)	1(1.45%)	1.00	0.31,NS
Atrial Fibrillation	0(0%)	4(5.80%)	6.18	0.012,S
CAD	1(3.23%)	3(4.35%)	0.14	0.70,NS
Anthropometry				
Weight(kg)	62.54±12.94	59.52±10.98	1.20	0.23,NS
Height(cms)	162.71±10.89	163.26±7.77	0.28	0.77,NS
BMI(kg/m2)	23.15±3.50	21.72±3.14	2.02	0.046,S
WC(cm)-Male	108.30±14.40	96.96±12.51	3.35	0.001,S
WC(cm)-Female	98.72±7.69	93.66±20.57	0.76	0.46,NS

Blood Pressure				
DBP(mmHg)	145.90±14.59	125.72±14	6.57	**0.0001,S**
SBP(mmHg)	92.48±7.99	82.69±8.45	5.44	**0.0001,S**
Blood Sugar				
PMBS	161.29±57.75	115.45±28.93	5.29	**0.0001,S**
FBS	127.54±47.89	90.75±26.37	4.94	**0.0001,S**
HDL Male	36.35±13.68	33.59±9.05	1.01	0.31,NS
HDL Female	37.63±11.34	39.5±9.29	0.43	0.67,NS
TG	163.4±90.75	110.50±43.41	3.95	**0.0001,S**
Diagnosis: Type of Stroke				
Ischaemic	19(61.29%)	42(60.87%)	0.001	0.96,NS
Haemorrhagic	12(38.71%)	27(39.13%)		

Discussion :-

This study aims at finding and identifying the role of metabolic syndrome in Cerebrovascular disease. As per our study, there was a higher incidence of stroke in males and females who met the modified NCEP ATPIII criteria for metabolic syndrome compared to males and females who didn't have metabolic syndrome. This can be compared to a study that estimated the risk of stroke in middle aged men diagnosed with metabolic syndrome (as defined by the NCEP criteria) which found that these men had a 2.05-fold (95% CI, 1.03 to 4.11; P=0.042) risk for all strokes and 2.41-fold (95% CI, 1.12 to 5.32; P=0.025) risk for ischemic stroke, after adjusting for socioeconomic status, smoking, alcohol, and family history of coronary heart disease. [19]

Our study also found that there was an increased incidence of cerebrovascular episodes in metabolic syndrome patients with history of previous stroke. This finding was supported by some other studies.The ACROSS, China Study that correlated metabolic syndrome and stroke recurrence found that at the one-year follow-up, a total of 21.5% of subjects with metabolic syndrome had stroke recurrence compared to 12.4% of those without metabolic syndrome. [20]

Other studies also support the findings that confirms , MetS as a potential risk factor for minor and major strokes. [16,21,22] Similar to some studies, our studied also showed that patients addicted to alcohol, and cigarrete smoking had a higher incidence of ischaemic stroke. [9,10,12,24]

In our study Hypertension, Diabetes and Dyslipidemia had no bearings on incidence of ischemic or hemorrhagic stroke when compared separately. Our findings corroborates with other studies that showed higher risk of stroke in MetS patients in both gender compare to controls non metabolic cases.[25] As MetS increases intracranial atherosclerosis so can be associated with higher risk of stroke, Ovbiagele et al. showed that half of patients with symptomatic intracranial atherosclerotic disease had metabolic syndrome.[26] On the other hand, prevalence of brain silent ischemic lesions increases in MetS independent of other risk factors. [27]

The metabolic syndrome is currently more frequent and a large number of people in worldwide are vulnerable, therefore, it is necessary to pay attention about the frequency of this syndrome in different parts of world in order to control the CVD and stroke prevalence, especially in the elderly.

Conclusion:

As the frequency of metabolic syndrome in stroke patients is high. It is important to change the lifestyle in order to prevent cardiovascular diseases and stroke. Health education, specific protection will be of paramount importance to curtail the burden of these diseases.

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