

Clinical Profile and Risk Factors of Massive Middle Cerebral Artery Infarction in a Tertiary Care Centre in Central Tamilnadu

M. Thangaraj¹, Shameer Palliyali²

ABSTRACT

Introduction: Large territory middle cerebral artery strokes are devastating events that result in high rates of disability and death. Nearly half of all stroke survivors never regain functional independence. Current research aimed to study the clinical profile and risk factors of massive middle cerebral artery (MCA) infarction and to study the relation of alcoholism and its pattern to massive MCA stroke.

Material and methods: Patients admitted with massive MCA infarct with an early ischemic change on CT affecting at least >50% of the MCA territory within 48 hours of symptom onset were included in the study. Stroke mimics and those with history of previous stroke were excluded. Study design was a cross sectional, observational study.

Results: A total of 60 cases were analyzed. Mean age was 55.4. 35% subjects had NIHSS >20. Diabetes was present in 18. Total of 60% were alcoholics, and 83% of males were alcoholics. 31 subjects were heavy drinkers. Binge drinking was present in 30%. Mean duration of alcohol was 9.5 years. Average intake per day was 120 ml. Mean ASPECT score in the subjects was 3. 25 patients had a MRS 4 at discharge. Craniotomy done in 6 cases. Total death were 17(29%). Aspiration pneumonia was the common cause of death (5).

Conclusion: NIHSS 20 or more was associated with adverse outcome (P value <0.05). 60% were alcoholics. Binge intake in 30% (associated with adverse outcome P value <0.05). Mean Aspect score was 3 (3 or less associated with adverse outcome P value <0.05).

Keywords: Massive Cerebral Infarction, Malignant Middle Cerebral Infarction, Alcoholism

INTRODUCTION

Globally stroke is the second leading cause of death in adults and two-thirds of these deaths occurred in people living in developing countries. Among the non communicable diseases in India stroke is one of the leading causes of disability and death. The estimated adjusted prevalence rates of stroke are between 84 and 262 strokes per 100,000 persons in rural areas and between 334 and 424 strokes per 100,000 persons in urban areas.¹ Malignant middle cerebral artery (MCA) infarction is a type of massive cerebral infarction which is used to describe a complete MCA territory infarction which cause significant space occupying effect. The incidence of malignant MCA infarction is estimated to be 2 to 10% of all ischemic stroke.² In the European Cooperative Acute Stroke Study one observation was that fatal brain edema occurred in patients with baseline CT scans (within 6 hours of onset of symptoms) showing more than 33% of MCA involvement.³ Krieger et al observed that patients with

more than 50% MCA territory hypo density on CT scan are associated with fatal brain edema.⁴ Computed tomography (CT) often demonstrates early ischemic changes in the MCA territory within the first few hours following ischemic stroke. The early findings include loss of normal grey white matter differentiation at the cortex, loss of distinction of the lentiform nucleus, and loss of the insular ribbon. Early brain swelling results in effacement of the cortical sulci. Increase in oedema due to extensive infarction may result in space occupying features with compression of adjacent structures, midline shift, and finally herniation. Early identification of patients who are at risk for malignant MCA infarction is essential for appropriate selection of medical and surgical interventions.

MATERIAL AND METHODS

A cross sectional, observational study was conducted on consecutive patients with massive MCA infarction admitted in department of neurology and internal medicine during the period January 2018 to December 2018.

Inclusion criteria: Patients with history, clinical examination and radiological investigation suggestive of massive middle cerebral artery infarction with an early ischemic change on CT affecting at least >50% of the MCA territory within 48 hours of symptom onset.

Exclusion criteria: Conditions that mimic stroke like post ictal state, TIA, migraine, metabolic abnormalities were excluded from the study. Patients with history of previous stroke were also excluded.

Patients satisfying inclusion criteria were enrolled in the study. Symptoms and signs was elicited on day 1 of hospital admission, and followed up till discharge/death. Radiological investigation was repeated in indicated cases in this period. Necessary data regarding chronic illnesses, smoking, alcoholism was collected in detail. Pattern of alcoholism was

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also assessed and was as defined by moderate ; not more than 2 drinks/day(males), 1 (female), heavy ; >2drinks(males), >1(female). Binge intake was defined as 5 or more drinks on a single instance for men or 4 or more drinks on a single instance for women, that to be within about 2 hours. NIHSS was calculated in all subjects at admission and 1 hour. ASPECTS scale was calculated using CT brain and score was given out of 10. Stroke was classified into various subtypes as per TOAST classification and categorized as large-artery atherosclerosis, cardio embolism, stroke of other determined etiology, and stroke of undetermined etiology. Modified rankin scale was calculated at the time of discharge from hospital and assigned from 0 to 6. 0 – no deficit and 6 - death.

RESULTS

A total of 60 subjects were enrolled in the study. Of the total number of patients 42 were males,18 females. Mean age was 55.8. 14 patients belonged to lower middle,41 patients upper lower, 5 patients lower socioeconomic class as per Modified Kuppuswamy scale. 10 patients had a history of Transient ischemic attack in the past.5 patients had seizure at onset of stroke. Among the chronic illnesses diabetes was the most common disease (Table-1).

48% of the subjects were smokers.22% had a smoking index of 200 or more.60% of the total subjects were alcoholic.83% of the males were alcoholic. Mean duration of alcoholism was 9.5 years. Mean average alcohol intake was 120 ml/day. Preferred preparation of alcohol use was brewed locally – arak in 3 subjects, beer in 5,Indian made foreign liquor – whisky in 18,Indian made foreign liquor –others in 10 subjects. Of the 36 alcoholics 31 were heavy drinkers (Table-2). Binge alcohol intake was present in 30% of subjects.

13 patients were conscious, 26 drowsy, 16 stuporous, and 5 comatose at admission. Gaze preference was present in 30% of subjects. Anisocoria was present in 8 patients. 11 had

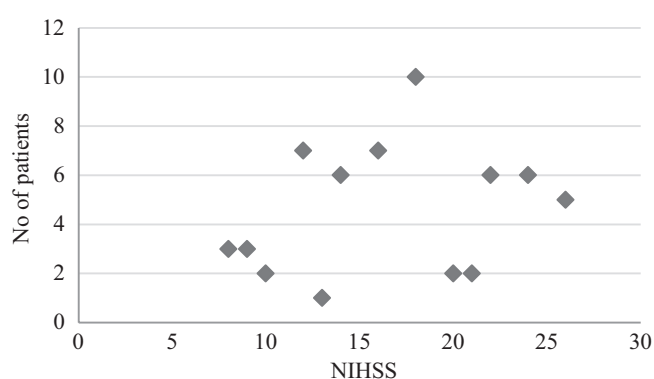


Figure-1:



Figure-2:

Chronic illnesses	
Diabetes	18
Hypertension	14
CAD	6
RHD	4
Hypothyroidism	1

Table-1:

Drinking pattern	
Non alcoholics	24
Moderate	5
Heavy	31

Table-2:

Subtypes of stroke	
LAA	35
Cardioembolic	9
SOD	2
SUD	15

LAA – Large artery atherosclerosis; SOD-Stroke of other determined etiology; SUD-Stroke of undetermined etiology

Table-3:

abnormal respiratory pattern. Mean time of arrival from the onset of stroke symptoms was 7.3 hours. Mean NIHSS at admission was 18 (Fig.1). 35% had NIHSS of 20 or more.

Mean ASPECTS score was 3 among the subjects (Fig-2). 53% of subjects had left hemispherical stroke.19% of subjects had impaired fasting glucose (100-125mg/dl). Mean non hdl was 134. Large artery atherosclerotic stroke was the major stroke subtype in 35 subjects (Table.3).

Craniectomy was done in 6 cases. There was 17 deaths of various causes.5 died of aspiration pneumonia, 4 because of brain herniation, 4 of cardiac arrhythmia,4 of unknown cause. Modified rankin scale was 4 in 41.6% of cases. All data were analyzed using SPSS software

DISCUSSION

Massive MCA infarction is often associated with significant morbidity and mortality. We often found young patients with no other co morbidities except for binge alcohol intake presenting with massive MCA infarction. In our study population 35 patient had age >50 years with 12 deaths in this group which was not statistically significant ($P>0.05$). Males outnumbered females in the ratio 2.5:1. There were 11 deaths among males ($P=0.574$). In our study there was high incidence of smoking (48%) and alcoholism (60%). Among tobacco users, 62% smoked cigarettes and others consumed other forms which is prevalent in India (like bidis, smokeless tobacco) which probably confer a higher risk for stroke. There was 12 deaths among alcoholics and five in non alcoholics and the difference was not significant. In our study 18 subjects had binge alcohol intake. There was 10 death among them ($P=0.002$). The effects of binge drinking is different from those of regular drinking. There are various mechanisms by which binge alcohol intake predisposes to stroke. Acute alcohol consumption and withdrawal have

been shown to cause a transient rise in systolic and diastolic blood pressure even in normotensive subjects. Alcohol consumption in large amount is linked with cardiomyopathy, which may cause cardiac arrhythmias and heart failure, both of which in turn increase the risk for embolic stroke. Binge drinking have been shown to trigger cardiac arrhythmias of both ventricular and supraventricular origin.⁵ Initial NIHSS of 20 or more was associated with adverse outcome with 12 death in this group which was statistically significant ($p < 0.05$). The NIHSS score strongly predicts the chance of a patient's recovery after an event of stroke. In a report of the Trial of Org 10172 in Acute Stroke Treatment (TOAST) study they found a score of ≥ 16 forecasts a high likelihood of death or severe disability whereas a score of ≤ 6 forecasts a good recovery.⁶ ASPECTS score based on non contrast CT was calculated in all patients where the mean score was 3. A score of 3 or less was associated with adverse outcome which was statistically significant ($p < 0.05$). In the initial ASPECTS study, noncontrast head CT scans from 156 patients with anterior circulation ischemia a value of 7 or less was associated with an increase in dependence and death at 3 months.⁷ Modified rankin score was 4 in majority (25 patients) indicating devastating clinical course of the massive MCA stroke. Lipid parameters showed a mean total cholesterol of 176mg/dL, mean LDL of 116 mg/dL, and mean non HDL of 134 mg/dL. Total cholesterol has been described as a risk factor for ischemic stroke in previous studies like Asia Pacific cohort studies collaboration.⁸ LDL cholesterol also has been associated with increased risk of ischemic stroke.⁹ Large artery atherosclerosis was the most common stroke subtype (As per TOAST subtype classification system). These patients had clinical and brain imaging findings of either significant ($>50\%$) stenosis or occlusion of a major brain artery or branch cortical artery, likely due to atherosclerosis. Acute stroke of other determined etiology was diagnosed in 2 patients of which one had APLA syndrome and one had hyperhomocysteinemia. Antiphospholipid antibodies syndrome is an important entity responsible for stroke in young. Our patient was a 30 year old female who had no other risk factors for stroke. Other autoimmune workup were negative in this patient and was diagnosed as primary APLA syndrome. Raised homocysteine level is also an important risk factor for the development of ischemic stroke in all populations especially in younger age group. Craniotomy was done in 6 patients. There was no significant difference in outcome between the 2 groups. This may be due to the timing of surgery. In our patients craniotomy was done in patients with neurological deterioration. A previous study by Ahamed Elswaf et al showed that decompression craniotomy within 6 hours of onset without waiting for neurological worsening has a significant impact on prognosis.¹⁰

CONCLUSION

Massive MCA infarction has got devastating clinical course. Binge alcohol intake has significant effect on outcome. Early decompression craniotomy is suggested for better clinical outcome.

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