Section: Medicine

Original Research Article

STUDY OF STROKE IN YOUNG PATIENTS

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Abstract

Background: Ischemic stroke is a clinical syndrome caused by various mechanisms of cerebrovascular disease. The risk of intracranial atherosclerotic stenosis is one of the major causes of stroke in young patients. **Materials and Methods:** 95 (ninety-five) patients of different age groups were studied with MRA to rule out occlusion or lesion. We also noted the tropical distribution of infarction, clinical manifestations, and recurrence after treatment. **Result:** Clinical manifestations included 32 (33.6%) alcoholics, 20 (21.5%) with Homocystine, 76 (80%) with HTN, 52 (54.7%) with DM, 29 (30%) with hyperlipidemia, 34 (35.7%) smokers, 46 (48.4%) with HTN + DM, 17 (17.8%) with HTN + DM + hyperlipidemia, 7 (7.3%) HTN+ DM+ hyperlipidemia + smoking + alcohol. The highest atherosclerotic lesion was observed in 35 (36.8%) in MCA, followed by 16 (16.8%) PCA, and the least in 1 (1.05%) in VA + BA. The major tropic area was 27 (28.4%) in cortical followed by 23 (24.2%) cortical and subcortical recurrence in uncontrolled risk factors, which was highest due to drug compliance 5, and least due to hyperlipidemia control. **Conclusion:** Present significant findings will help the neurophysion or neurosurgeon for efficient management and prevent recurrence because recurrence of stroke worsens the physical and mental conditions of patients especially young patients.

INTRODUCTION

Ischemic stroke is quite heterogeneous in pathophysiological mechanism, and this forms the basis of stroke subtyping. Recently, genetic mechanisms underlying stroke have also been found to be subtype-specific.[1] It is interesting to note that there is regional variability in the pattern of stroke subtypes and their risk factors. Intracranial atherosclerosis has been recognized as a serious cause of stroke.[2] 7-10% of patients with cerebrovascular disease get ischemic stroke.

The risk factors include hypertension, hypercholesterolemia, tobacco smoking, and diabetes mellitus.[3] Recently the metabolic syndrome, a cluster of risk factors that are linked to insulin resistance and increased risk of coronary heart disease and stroke, has been implicated as an independent predictor of stroke.[4] Hence, an attempt is made to evaluate the different causes of stroke in young adults.

MATERIALS AND METHODS

95 patients aged between 20 to 48 years were admitted to the Neuro-Surgery department of Nimra Institute of Medical Sciences, Ibrahim patnam Jupidi, Vijayawada, Andhra Pradesh-521456 were studied.

Inclusion Criteria

Diagnosis of ischemic stroke due to large intracranial atherosclerosis and their relative who gave consent in writing for the study were selected for the study.

Exclusion Criteria

Patients with organic mental disorders, arterial fibrillation, acute anterior wall ST elevation myocardial infarction < 30 days, mitral stenosis, intracardiac thrombus or vegetations, intracranial tumors, arteriovenous malformations, moyamoya disease, and arteritis were excluded from the study.

Method: The diagnosis of ischemic stroke due to large artery intracranial arthrosclerosis was made as per the TOAST (Trial of ORG 10172 in Acute Stroke Treatment) classification. Physical and neurological examinations were done; disease duration, laboratory findings, any complications, and treatment received were noted. The data was noted in pre-designed case record forms.

MRA (Magnetic Resonance Angiography) (GE systems 1.5 T) was done in all patients. Stenosis (segmental flow gap or luminal stenosis or occlusion) was assessed in proximal middle cerebral arteries, internal carotid arteries, VAS, and BA. The distribution of stenosis and occlusive lesions was

noted. Patients were put on treatment with antiplatelet drugs in addition to other required medications.

HTN (hypertension) history of HTN in the post, systolic blood pressure (SBP) ≤ 140 mm/Hg and/or diastolic blood pressure ≤ 90 mm/Hg, diabetes mellitus (DM)—history of DM Fasting blood glucose > 126 mg/dl or 2-h postprandial blood glucose > 200 mg/dl. HbA1C > 6.5 Hyperhomocysteinemia—elevated levels of serum homocysteine of more than 20 μmoles/L. Hyperlipidemia—History of dyslipidemia cholesterol, cholesterol > 200 mg/dL, LDL (low-density lipoprotein) > 100 mg/dL, or triglyceride > 150 mg/dL. Smoking history and history of alcoholism were also noted.

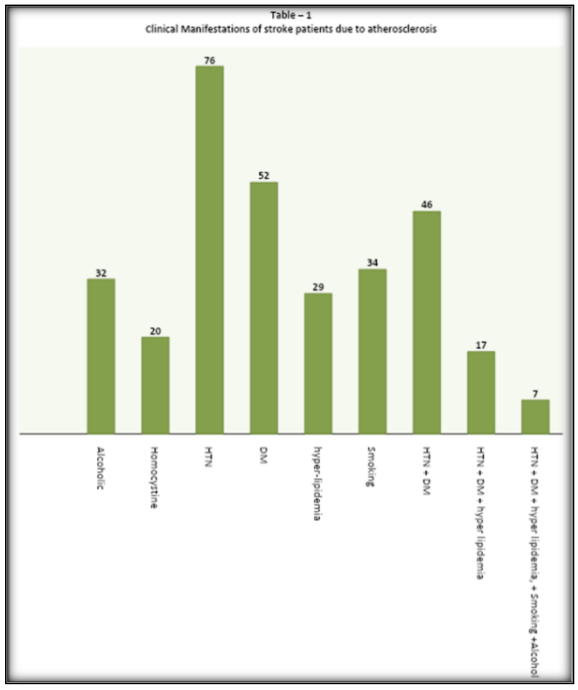
The duration of the study was June 2024 to January 2025.

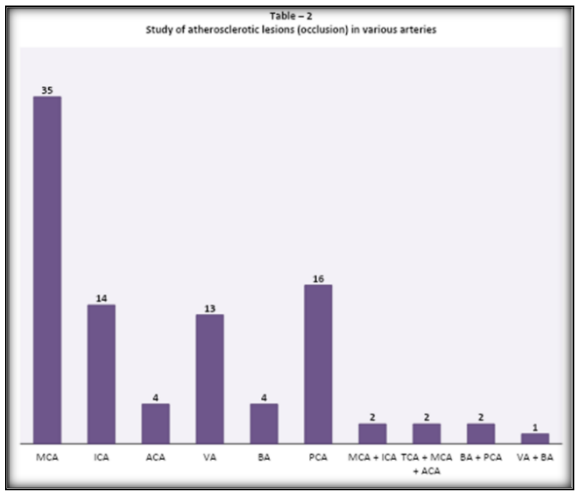
Statistical analysis: Various findings of clinical manifestations, distributions of atherosclerotic lesions, and tropical distributions of the recurrence of strokes were classified with percentages. The statistical analysis was performed in SPSS software. The ratio of male and female was 3:1.

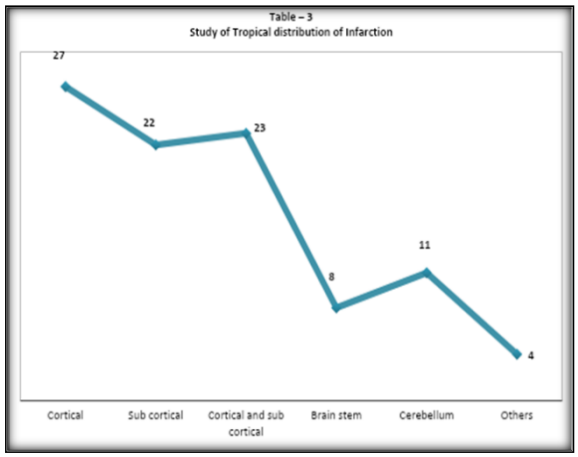
RESULTS

[Table 1] Clinical manifestations of stroke patients due to atherosclerosis: 32 (33.6%) alcoholic, 20 (21.05%) homocysteine, 76 (80%) hypertension (HTN), 52 (54.7%) DM, 29 (30%) hyperlipidemia, 34 (35.7%) smoking, 46 (48.4%) HTN + DM, 17 (17.8%) HTN + DM + hyperlipidemia, 7 (7.3%): HTN + DM + hyperlipidemia + smoking + alcohol

[Table 2] Study of atherosclerotic lesions (occlusion) in variable arteries: 35 (36.8%) MCA, 14 (14.7%) ICA, 4 (4.2%) ACA, 13 (13.6%) VA, 4 (4.3%) BA, 16 (16.8%) PCA, 2 (2.1%) MCA + ICA, 2 (2.1%) ICA + MCA + ACA, 1 (1.05%) BA + PCA, 2 (1.4%) VA + BA







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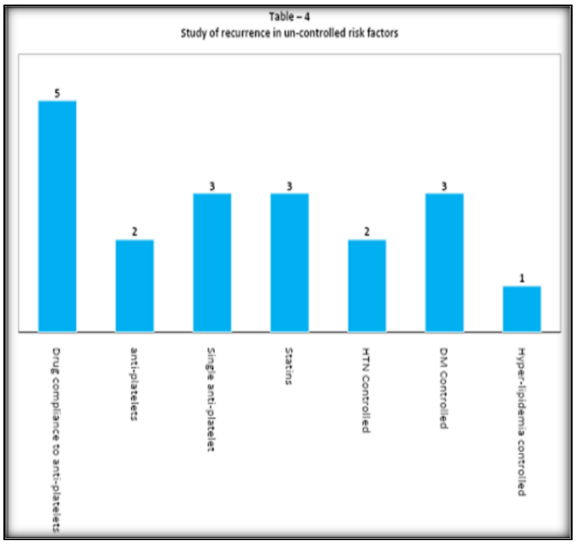

[Table 3] Study of tropical distribution of infarction: 27 (28.4%) cortical, 22 (23.1%) subcortical, 23 (24.2%) cortical and subcortical, 8 (8.4%) brain stem, 11 (11.5%) cerebellum, 4 (4.2%) others

[Table 4] Study of recurrence in uncontrolled risk factors: 5 patients had Drug compliance to antiplatelets, 2 had 3-Drug anti-platelets, 3 had single anti-plate, 3 had statins, 2 had HTN controlled, 3 had DM controlled, 1 had hyperlipidemia controlled.

Table 1: Clinical Manifestations of stroke patients due to atherosclerosis.

Sl. No	Clinical Manifestations	No. of patients	Percentage (%)
1	Alcoholic	32	33.6
2	Homocystine	20	21.05
3	HTN	76	80
4	DM	52	54.7
5	hyper-lipidemia	29	30
6	Smoking	34	35.7
7	HTN + DM	46	48.4
8	HTN + DM + hyper lipidemia	17	17.8
9	HTN + DM + hyper lipidemia, + Smoking +Alcohol	7	7.3

Table 2: Study of atherosclerotic lesions (occlusion) in various arteries

Name of the artery	Frequency	Percentage of lesion (%)
MCA	35	36.8
ICA	14	14.7
ACA	4	4.2
VA	13	13.6
BA	4	4.3
PCA	16	16.8
MCA + ICA	2	2.1
TCA + MCA + ACA	2	2.1
BA + PCA	2	2.1
VA + BA	1	1.05

MCA = Middle cerebral artery
ICA = Internal carotid artery,
ACA = Anterior Cerebral artery,
VA = Vertebral artery,
BA = Basilar artery,
PCA = Post cerebral artery

Table 3: Study of Tropical distribution of Infarction

Location	No. of patients (95)	Percentage (%)
Cortical	27	28.4
Sub cortical	22	23.1
Cortical and sub cortical	23	24.1
Brain stem	8	8.4
Cerebellum	11	11.5
Others	4	4.2

Table 4: Study of recurrence in un-controlled risk factors

Parameters	Patients with recurrence
Drug compliance to anti-platelets	5
anti-platelets	2
Single anti-platelet	3
Statins	3
HTN Controlled	2
DM Controlled	3
Hyper-lipidemia controlled	1

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DISCUSSION

Present study of stroke in young patients. The clinical manifestations were 32 (33.6%) alcoholic, 20 (21.5%) with homocysteine, 76 (80%) HTN, 52 (54.7%) DM, 29 (30%) hyperlipidemia, 34 (35.7%) smokers, 46 (48.4%) with HTN+DM, 17 (17.8%) with HTN+DM+ hyperlipidemia, and 7 (7.3%) HTN + Hyperlipidemia + Smoking [Table 1]. In the study of atherosclerosis lesions (occlusion) in various arteries. The highest occlusion was 35 (36.8%) in MCA, followed by 16 (16.8%), and the least occlusion was in 1 (1.05%) VA + BA [Table 2]. In the study of tropical distribution of infarction, the highest area was 27 (28.4%) cortical, followed by cortical and subcortical [Table 3]. In the study of recurrence in uncontrolled risk factors. The highest was 5 due to drug compliance to antiplatelet, and the least was hyperlipidemia controlled [Table 4]. These findings are more or less in agreement with previous studies.[5-7]

Concurrent atherosclerosis in extracranial and intracranial arteries was also studied. HTN emerged as the strongest risk factor for concurrent lesion or occlusion, followed by DM, coronary artery, and smoking. Occlusion of large branches of the circle of Willis can lead to stroke by hypoperfusion or by artery-to-artery embolism.[8] It is also noted that stroke is one of the leading causes of death in India. Stroke was the cause of the death in 13%, which was similar to death due to coronary artery disease, 14%, in Andhra Pradesh.[9]

Apart from atherosclerosis, gene disorders do lead to stroke in young individuals without known risk factors, and they include CADASIL (cerebral autosomal dominant arteriopathy with subcortical infarcts and leukoencephalopathy), Fabry's disease, and sickle cell disease.[10] Hence, genetic contribution to stroke is polygenic. It was also observed that apolipoprotein E gene (gene involved with lipid metabolism) was evaluated in stroke patients.

It is accepted globally that tea is the commonest beverage after water. It is shown that a beneficial effect is that tea consumption of 450 ml or more, or more than or equal to three cups per day, was associated with a reduction of the incidence of recurrent ischemic stroke, a significant decrement of systolic blood pressure, better control of fasting hyperglycemia, and a lowering down of the level of total cholesterol and LDL level in the subject with hypercholesterolemia.[11]

CONCLUSION

The present study of strokes due to atherosclerosis has multiple etiologies like HTN, DM, smoking, and dyslipidemia, as they are not being adequately controlled; hence there is the challenge of a high stroke incidence. Apart from public awareness, it needs more inventional studies to find out the efficacy of preventive agents such as antihypertensives and antiplatelets because the exact pathogenesis of stroke is still unclear.

Limitation of study: Owing to the tertiary location of the research center, the small number of patients, and the lack of the latest techniques, we have limited findings and results.

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