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REVIEW ARTICLE

A STUDY ON DEMOGRAPHY, CLINICAL PROFILE AND ETIOLOGY OF STROKE IN YOUNG ADULTS

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ABSTRACT

Background: A stroke, or cerebrovascular accident is defined as an abrupt onset of a neurologic deficit that is attributable to a focal vascular cause. Cerebral ischemia is caused by a reduction in blood flow that last longer than several seconds. Neurologic symptoms are manifested within seconds because neurons lack glycogen, so energy failure is rapid. If the cessation of blood flow lasts for more than few minutes, infarction or death of brain tissue results. When blood flow is quickly restored , brain tissue can recover fully and the patient symptoms are only transient: this is known as Transient Ischemic Attack (TIA). Within the ischemic bed are two zones: one is the core ischemic zone and other is penumbra or ischemic but still viable cells. Although it is considered to be a disease of old population, It is not infrequent in young adults. Stroke in young adult poses a Major socioeconomic health problem especially in developing countries.[1] ***Aims and Objectives:*** To study etiology and clinical profile of stroke in young adults (15-45 years) in a tertiary care centre. ***Methodology:*** The study is based on prospective collection of data of 150 young adults aged between 15-45 years diagnosed as stroke who were admitted in medical ward or neurology ward in a tertiary care hospital. Patients admitted at Maharana Bhupal Government Hospital Udaipur diagnosed with stroke , confirmed with neuroimaging and meeting the inclusion criteria during study period of 2 years were taken into consideration for the study. ***Results:*** In this study 150 cases were admitted with stroke who met the inclusion criteria were enrolled in study after taking consent. At presentation complete history, relevant clinical examination, neuroimaging was done. The etiology and clinical outcome were analyzed in this study. ***Conclusion:*** In this study, higher incidence of developing stroke is observed in males (M:F= 2.9:1). Most of the patients in this study population were in the age group of 41-45 years. Clinically, motor weakness was the predominant symptom observed. 24% of patients were diabetics, 28% were hypertensives, 52% were smokers and 54.6% were alcoholics. The most common artery involved was middle cerebral artery (82%) while the common etiology was atherosclerosis (50%).

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INTRODUCTION

A stroke or cerebrovascular is defined as an abrupt onset of a neurologic deficit that is attributable to a focal vascular cause. Thus the definition of stroke is clinical, and laboratory studies including brain imaging are used to support the diagnosis.[1] Stroke is the most common life threatening and disabling neurological condition. Although it is considered to be as a disease of older population, it is not infrequent in young adults. Stroke in young adults poses a major socioeconomic health problem especially in developing countries. The most common symptom of a stroke is sudden weakness or numbness of the face, arm or leg, most often on one side of the body, occurring in 90% of the stroke. Other symptoms include confusion; difficulty speaking or understanding speech; difficulty seeing with one or both eyes; difficulty walking, dizziness and loss of balance or coordination; severe headache with no known cause.[2] Stroke is the most important single cause of long term disability in a community setting as about 30 to 50% of stroke patients are left with residual deficits.

The hospital based studies had shown that 2%of all , 4 to 5% of medical and 20% of neurological admissions were due to stroke. Not only this, survivors of a transient ischemic attack (TIA) or stroke are at an increased risk of stroke.[3] So, this study was conducted with the aim to assess etiology, clinical profile of stroke in young adults(15-45 years) in a tertiary care centre.

MATERIALS AND METHODS

STUDY SITE: Patients admitted in medicine and neurology departments of Maharana Bhupal Government hospital, Rabindranath Tagore Medical College, Udaipur were enrolled.

STUDY DESIGN: Hospital based prospective observational study.

STUDY PERIOD: A period of 2 year from August 2020 to July 2022.

***STUDY POPULATION**:* Patients admitted in medicine and neurology department of MBGH and RNT Medical College of age group 15-45 years diagnosed with stroke (based on neuroimaging) were enrolled in the study after taking proper informed consent.

Inclusion Criteria

- Age group 15-45 years
- A diagnosis of stroke based on neuroimaging

Exclusion Criteria

- Age <15 years and Age >45 years
- Transient Ischemic Attacks
- Patient with severe metabolic disturbances complicating the stroke
- Head injury and ICSOL
- Patient with past history of migraine
- Non consenting individuals
- Patients on anti coagulants, anti platelets, anti epileptics drugs
- Pregnant women or post partum women within 42 days.

Study Method

After an informed consent all subjects suspected to be stroke were investigated by neuroimaging (CT or MRI). General Physical Examination or Systemic Examination was done. Their detailed clinical history, demographic profile was recorded. Address and contact number of patient were taken for further communication. Patient's details regarding age, sex, risk factors like hypertension, diabetes mellitus, ischemic heart disease, hypercholesterolemia, smoking, past history of TIA was recorded. The onset of symptoms and signs was recorded. CT Brain or/and MRI brain with angiography was done in all patients. Severity of the stroke was calculated by Modified Rankin Scale on day of admission. Outcome (death or discharge) was correlated with severity and neuroimaging. All the information was recorded in predesigned proforma formed in Microsoft excel for final analysis.

Modified Rankin Score on admission[4]

Score Description

0 No symptoms at all

- No significant disability despite symptoms; able to carry out all usual duties and activities
- Slight disability; unable to carry out all previous activities, but able to look after own affairs without assistance
- Moderate disability; requiring some help, but able to walk without assistance
- Moderately severe disability; unable to walk without assistance and unable to attend to own bodily needs without assistance
- Severe disability; bedridden, incontinent and requiring constant nursing care and attention
- Dead

TOTAL (0–6):

STATISTICAL ANALYSIS: Summary statistics will be done by Proportion, Mean, Median and Standard Deviation. The inferential statistics will be done by ANOVA and Pearson's correlation. All measurements will be done using SPSS version 21.0. 'p' value <0.05 will be considered statistically significant.

OBSERVATIONS: Among the study population 150 patients, 112(74%) were male and 38(26%) were females who suffered with stroke. Among the age groups involved 46% were between 41-45 years of age group. Out of which 58 were males and 12 females. Between 36-40 years age group, constituted of about 28% of total study population. Out of which, 24% were males and 4% were females. 22 patients with stroke (about 14%) were categorized under age group 31-35 years, out of which 4% were male and 10% were females. And about 4% of total study population fell under 15-30 years of age group, among which 2%were males and 2% were females. Out of 150 patients, 68 patients (45%) had dyslipidemia. In this study 78 patients (52%) were smoker. Among the 78 smokers, 76 were male. 82 patients (54.6%)were alcoholics. 70 patients were male, 12 were female. In this study, 36 patients (24%) were diabetics while42 patients(28%) were found to have hypertension . 14 patients had ischemic heart disease (IHD). Out of them, 2 patients had poor compliance of medication. 12 were male and 2 were female. Patients were RTPCR positive for Covid 19 virus infection.

BASIC PROFILE OF THE STUDY POPULATION

N= 150	NO	PERCENTAGE
MALE	112	74.6%
FEMALE	38	25.3%
AGE		
15-30	16	10.6%
31-35	22	14.6%
36-40	42	28%
41-45	70	46.6%
SMOKER	78	52%
ALCOHOL	82	54.6%
DIABETES MELLITUS	36	24%
ISCHEMIC HEART DISEASE	14	9.33%
SYSTEMIC HYPERTENSION	42	28%
DYSLIPIDEMIA	68	45.33%
COVID (RTPCR POSITIVE)	2	1.33%

CLINICAL PRESENTATION

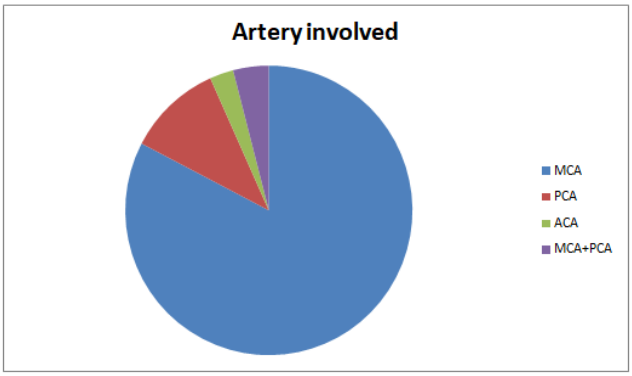
N = 150	Total no	Percentage
Symptoms		
1) Motor weakness	92	61.33%
2) Headache	24	16%
3) Giddiness	18	12%
4) Blurring of vision	34	22.66%
5) Vomiting	48	32%
6) Seizures	12	8%
7) Loss of consciousness	56	37.33%
8) Fever	4	2.66%
9) Chest pain/ palpitations	10	6.66%
Signs		
1) Mono/ hemi/para paresis or plegia	92	61.33%
2) Papilledema	32	21.33%
3) Cranial nerve abnormalities	22	14.66%
4) Pupillary signs	27	18%
5) Neck rigidity	3	2%
6) Organomegaly	2	1.33%
7) Anemia	17	11.33%
8) Cardiacmurmurs	9	6%
9) Atrial fibrillation	5	3.33%

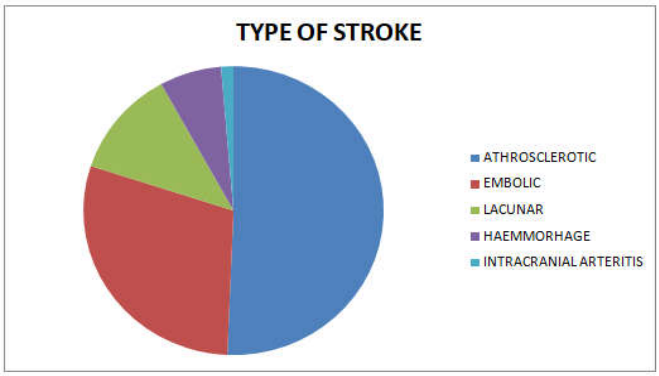
FINAL MRS SCORE[4]	N=150
NO SYMPTOMS	20
NO DISABILITY	36
SLIGHT DISABILITY	26
MODERATE DISABILITY	30
SEVERE DISABILITY	36
DEAD	2

There were varied presentations among the patients in this study. 92 patients of them presented with motor weakness (quadriplegia/ paraplegia/ monoplegia/ hemiplegia). Out of them 2 had death as outcome. 42 patients had severe disability. 22 patients had moderate disability and 8 had slight disability. 20 patients recovers completely. Loss of consciousness was present in 56 patients which accounted for 37% of patients. Vomiting was present in 48 patients. It accounts for about 32% of population. Headache was present in 24 patients accounting for about 16%. In the study group blurring of vision was present in 34 patients which accounted for 22% of population. Other rare symptoms were seizures, fever, chest pain which was present in 12, 4, 10 patients respectively.

On examination, Pupillary involvement was present in 27 patients. And papilledema was present in 32 patients. Cranial nerve involvement was present in 22 patients. Of which the most common cranial nerve involved was 7th nerve in 14 patients. 6th cranial nerve was involved in 6 patients. 2 patients had involvement of 9th,10th, 11th cranial nerve. 92 (61%)patients had motor weakness in one or more limbs. 5 patients(3.33%) had irregularly irregular pulse and atrial fibrillation on ECG. Other findings included anemia, organomegaly, neck rigidity and cardiac murmurs.

RADIOLOGICAL FINDINGS: The patient who were clinically suspected of having stroke were evaluated on basis of neuroimaging like CT (computed tomography) or MRI(Magnetic resonance Imaging) Brain. Along with this angiography of brain and neck vessels was also done to see the artery involved. In the study, 124 patients were found to have stroke involving the Middle cerebral artery (MCA), 16 patients had involvement of Posterior Cerebral artery(PCA), 4 patients were found to have involvement of ACA territory. 6 patients had involvement of both MCA and PCA territory. Atherosclerotic stroke was the most common etiological factor accounting for 76 patients (50%),44 patients had embolic stroke, 18 patients had lacunar infarcts, 10 patients had hemorrhagic stroke. While 2 of them had intracranial arteritis. All the patients were further screened with 2D echo. 16 patients(10%) had evidence of coronary artery disease. Valvular heart diseases were present in 14 patients(9%). Most common lesion was Mitral regurgitation. Left ventricular hypertrophy was involved in 42 patients (38%). Cardiomyopathy was present in 10 patients (7%). 68 patients had normal echo.





Echo finding	No of patients	Percentage
Cad	16	10.6%
Valvular heart disease	14	9.33%
Cardiomyopathy	10	6.66%
Left ventricular hypertrophy	42	28%
Normal echo	68	45.33%

DISCUSSION

Stroke among young adults has been increasing in incidence in recent times. In concordance with the other studies in India like Hussain M (2008)[5], predominance of stroke was seen among males in this study population(112 out of 150).

The male preponderance seen in the present study is similar to other studies; however studies also show non significant sex differences in hemorrhagic stroke[6]. Hospital- based studies from India revealed a high proportion of stroke in young ranging between 15 and 30%[7,8,9]. The mean age observed was 42 years , with highest incidence of stroke was seen in the 4th decade accounting about 46% falling between age group 41-45 years. HN Harsha Kumar (2011)[10] also observed that stroke is more common (78 out of 109) among 31-45 years category as compare with the <30 years category. Smoking, alcoholism and dyslipidemia have been found to be significantly associated with stroke. In study by HN Harsha Kumar (2011)[10] there were 76(69.7%) smokers, 53(48.6%) alcoholics, 59(54.1%) diabetics and 79(72.5%) hypertensives. Important modifiable risk factors such as smoking and alcohol consumption were found to be significantly associated with ischemic stroke in Hussain M(2018)[5] study. Diabetes and ischemic heart disease was found to have a very low association with the occurrence of stroke among young individuals in the study. Hypertension was reported as a risk factor in most studies. Diabetes Mellitus has been reported as a risk factor for ischemic stroke from India[8] and Switzerland[11]. In this study the most important risk factors were smoking and alcohol(52% and 54%) . Hyper Homocysteinemia has significant association with the causation of stroke in the young individuals. Of which, 18.4% was observed with atherosclerosis contributing to the evidence of its pro- thrombotic role in occurrence of stroke in young adults[12]. Recurrence of stroke though was seen in 10%, but no mortality and less morbidity has been among these patients. Patients with no known associated risk factors were found to have initial severe presentation with persistent clinical morbidity. Most common clinical finding was hemiplegia with seventh nerve cranial palsy. Majority have left sided brain involvement associated with significant speech abnormalities, observed in this study. HN Harsha (2011)[10]cases of embolic stroke mostly presented with loss of power in limbs. Mostly (12 cases), they woke up in the morning and noticed loss of power. In concordance with other studies Hussain M et al(2008)[5] in India, atherosclerosis remains the major etiological association of ischemic stroke in this study whereas, still in about 20% of total population, etiology of arterial ischemic stroke was undetermined.[13] Low serum Vitamin D may be an independent risk factor for cerebrovascular diseases in older koreans[14].

CONCLUSION

It has been observed that clinically, weakness was the predominant symptom observed . Speech involvement has a higher incidence and also has significant impact on final outcome among the study population. Involvement of seventh cranial nerve is seen frequently among the study group. Atherosclerosis was the most common etiology of stroke in young adults. Smoking and alcohol was most common modifiable risk factors. Despite the lack of absolute accuracy of classification models, scoring systems that have good predictive accuracy can play an important role in assessing the severity and outcome of stroke. They also help in prognostication of patients with acute stroke in young.

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