

A Hospital Based Study on Etiology and Clinical Profile of Stroke in Young Adults: From Southern Rajasthan

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ABSTRACT

Background: 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. Stroke is the third most common cause of mortality and the fourth leading cause of disease burden in the world.

Aims and Objective: 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 100 young adults aged between 15-45 years diagnosed as stroke who admitted in medical ward or neurology ward in a tertiary care centre where systematic computer coding for registry is used. Patients admitted at M.B. Govt. Hospital, Udaipur diagnosed with stroke confirmed with imaging at admission and meeting the inclusion criteria, during the study period of one year taken into consideration for the study.

Results: In this study, 100 cases admitted with Stroke which met inclusion criteria are taken into the study. At presentation, complete history, relevant clinical examination was done. The etiology and clinical outcome were analyzed in this study.

Conclusion: In this study, higher incidence of developing stroke in males compared to females (Male: Female = 2.6: 1) is observed. Most of the patients in this study population were in the age group of 41-45 years. Clinically, weakness was the predominant symptom observed.


Keywords: Etiology, Clinical Profile, Stroke.

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Article History:

Received: 09-06-2020, Revised: 05-07-2020, Accepted: 30-07-2020

Access this article online	
Website: www.ijmrp.com	Quick Response code 
DOI: 10.21276/ijmrp.2020.6.4.019	

INTRODUCTION

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.¹

World Health Organization (WHO) definition of stroke is: "rapidly developing clinical signs of focal (or global) disturbance of cerebral function, with symptoms lasting 24 hours or longer or leading to death, with no apparent cause other than of vascular origin."²

Majority of the published reports keep the age of stroke in young between 15 and 45 years. A hospital- based study from India showed the proportion of stroke in young ranging between 15% and 30%.³ [In population-based study, 8.8% of stroke participants were young.⁴]

Stroke leads to cut off of the oxygen and nutrients supply to the cerebral tissue leading to cerebral damage.¹ 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 strokes.²

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; fainting or unconsciousness.⁵

It leaves the patients with residual disabilities like physical dependence, cognitive decline, depression, and seizures. A very severe stroke can cause sudden death.

Early identification and implication of preventive measures can help in bringing down the occurrence of stroke and reduce the financial and emotional burden in the family. A dedicated evaluation for identifying the cause is needed to treat and prevent further recurrence.

So, this study was conducted with the aim of to assess etiology, clinical profile of stroke in young adults (15-45 years) in a tertiary care centre.

MATERIALS AND METHODS

Prospective and clinical study conducted at M.B. Govt. Hospital, Udaipur from August 2018 to July 2019 on 100 patients aged (15-45 years) diagnosed as stroke in medical ward or neurology ward, Department of General Medicine during the study period of Aug 2018 to July 2019.

Patients admitted in general medical ward / neurology ward with abrupt onset of focal neurological deficit of vascular origin (ischaemic or haemorrhagic) and persisting for more than 24hrs. Pregnant women or postpartum women within 30 days, with Neuro infections causing weakness, venous strokes, Haemorrhagic strokes were included. Patient with Head trauma and patients on drugs /toxins were excluded.

A proforma prepared which included detailed history, clinical examination and requisite investigations available in the hospital. Investigations like complete hemogram, routine urine analysis, blood sugar, serum electrolytes, serum creatinine, blood urea, serum homocysteine, chest X-ray, electrocardiogram, CT or MRI brain done in all patients. Investigations like ANA profile, Anti Phospholipid Antibody (APLA) done in the patients as required to assess the clinical outcome of the patients, MRS scoring is done at the baseline and after 3 months and are correlated accordingly. This scale runs from 0-6, running from perfect health without symptoms to death.

Table 1: Basic Profile of The Study Population

N=100	No
Male	72
Female	28
Age	
15-30	6
31 - 35	12
36 - 40	32
41 - 45	50
DLP	48
Smoker	58
Alcohol	52
Diabetes	26
Systemic hypertension	26
IHD	14
Final MRS score	
No Symptoms	10
No significant disability	26
Slight Disability	16
Moderate Disability	20
Severe Disability	26
Dead	2

Table 2: Association of Final mRS score with other parameter

	Final mRS score						Total
	No Symptoms (10)	No significant disability (26)	Slight Disability (16)	Moderate Disability (20)	Severe Disability (26)	Dead (2)	
Male	4	24	12	12	20	0	72
Female	6	2	4	8	6	2	28
Age							
15-30	2	2	0	2	0	0	6
31 - 35	2	0	2	4	2	2	12
36 - 40	2	6	8	6	10	0	32
41 - 45	4	18	6	8	14	0	50
Total	10	26	16	20	26	2	100
DLP	4	12	10	10	10	2	48
Smoker	4	20	12	10	12	0	58
Alcohol	2	16	10	10	14	0	52
Diabetes	2	4	6	4	10	0	26
Systemic hypertension	2	4	6	4	10	0	26
IHD	0	4	2	4	2	2	14

OBSERVATIONS

Among the study population of 100 patients, 72 (72 %) were male and 28 (28%) were female suffered with Stroke. Out of 72 males in the study, 20 had persistent severe disability and with 12 each having mild to moderate disability and 4 have recovered completely from disability and symptoms.

Among 28 females in the study, 6 had severe disability and 6 had recovered completely from the symptoms. Among the age groups involved, most commonly patients 50% were between 41- 45 years of age group. Out of which 38 were males and 12 females. Between 36-40 years age group, constituted of about 32% of total study population. Out of which, 28% were males and 4% were

females. 12 patients with Stroke (about 12%) were categorized under age group of 31-35years, out of which 2% were male and 10% were females. And about 6% of total study population fall under 15-30years of age group, among which 4% were males and 2% were female. Among them, about 26 patients had complete recovery from clinical signs left with no disability and were able to carry out their regular activities with ease. Among them, 18 were under 41-45years of age group. About 10 patients had complete recovery of both signs and symptoms, among which 4 are under 41- 45 years of age group and rest of them 2 each among each category of age respectively. Death occurred among two patients in total study in 31-35 years category.

Out of 100 patients, 48 patients had history of dyslipidemia. Among them with dyslipidemia, 2 patients got expired, 10 patients were left with persistent severe disability, 10 were with moderate and slight disability respectively. 16 were left with no disability and completely recovered from AIS. Patients who had no history of dyslipidemia, constituted about 52 patients of total population. Among them, 16 patients were left with severe disability, 10 patients had moderate disability, 6 patients had mild disability. 20 patients had recovery with no disability. Among the 58 smokers, 12 patients had severe disability. 10 patients and 12 patients had moderate to slight disability respectively. Total of 24 patients had no disability, out of which 4 patients recovered completely without signs and symptoms. Among the non-smokers, 2 patients had death and 14 patients had severe disability. 10 patients and 4 patients had moderate and slight disability respectively. 12 patients total have recovered clinically, out of which 6 had complete recovery from both signs and symptoms. Out of 52 patients of alcoholics, 14 patients had severe disability. 10 patients each had moderate and slight disability respectively. 18 patients in total had complete recovery clinically, among which only had complete recovery from both signs and symptoms of stroke. Among the non-alcoholics, 2 had experienced death as final outcome. 12 patients had severe disability. 10 patients and 6 patients had moderate and slight disability respectively. 18

patients had complete recovery clinically, among which 8 had recovery completely from both signs and symptoms of stroke. Among the 26 diabetics population, 10 patients had severe disability. 4 patients and 6 patients had moderate and slight disability respectively. 6 patients had complete recovery clinically. Out of which 8 had complete recovery from both signs and symptoms. Among the 100 patients, 26 patients were found to have hypertension among the hypertensive group, 10 patients had severe disability. 4 patients and 6 patients had moderate and slight disability. 6 patients had complete recovery clinically and among them, 2 patients were completely symptomatically free. Among the non-hypertensive patients, 2 patients have death as final consequence. 16 patients had severe disability. 16 patients and 10 patients had moderate and slight disability. 30 patients had complete recovery clinically, among which 8 were completely symptomatically free about patients had ischemic heart disease (IHD). Out of them, 2 patients had death. 2 patients had severe disability. 4 patients and 2 patients had moderate and slight disability respectively. 4 patients had complete recovery clinically. Among the study population, 10 patients had history of stroke presented with recurrent stroke, none had death as final consequence. 2 (20%) patient had severe disability. 8 patients moderate and slight disability. 8 (80%) patients had complete recovery from stroke clinically, among which 4 (40%) patients were symptomatically free.

Figure 1: Associated Symptoms, Etiology, Area and site of involvement

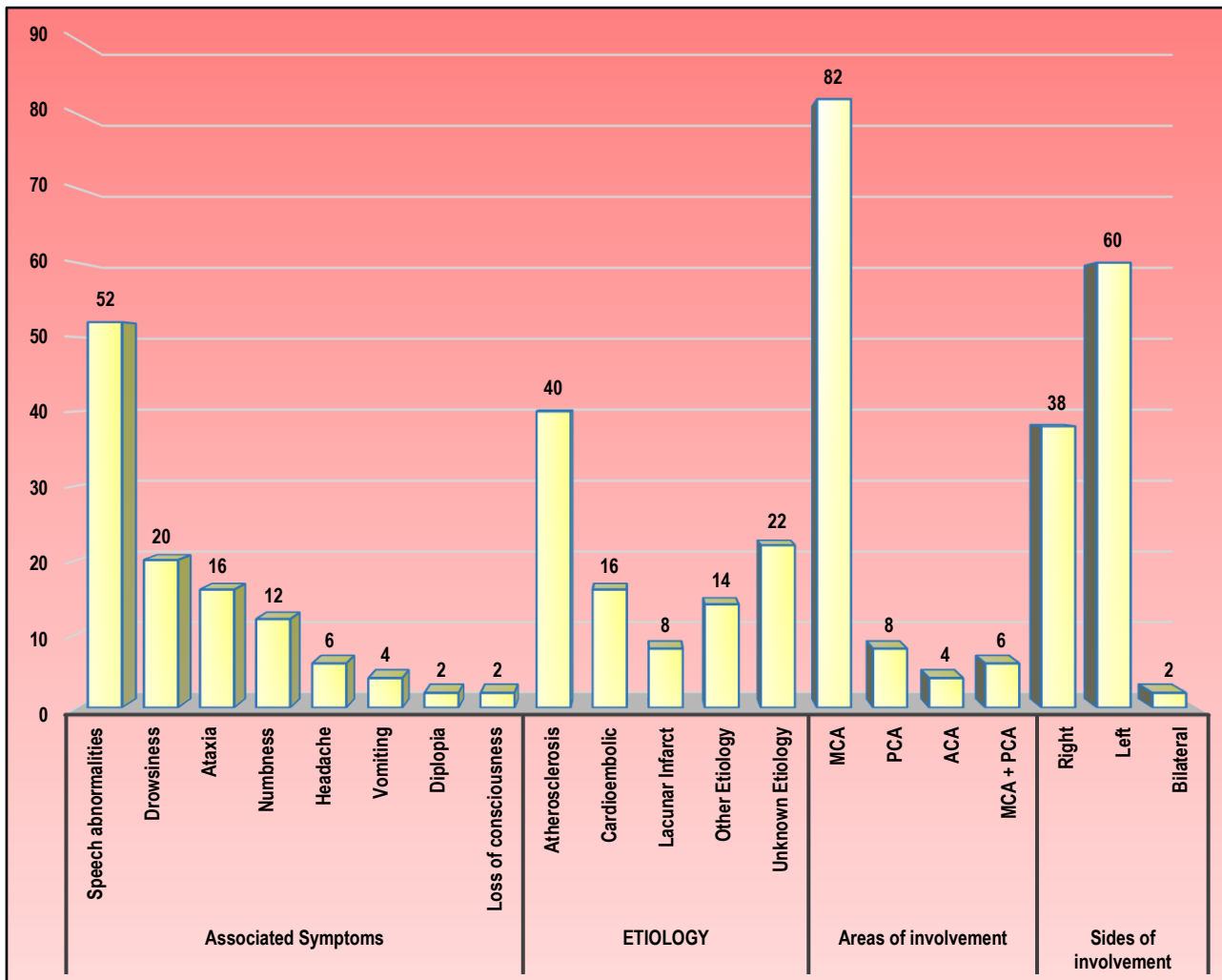


Table 3: Association of Final mRS score with other parameter

	FINAL mRS SCORE						Total (100)
	No Symptoms (10)	No significant disability (26)	Slight Disability (16)	Moderate Disability (20)	Severe Disability (26)	Dead (2)	
IHD	0	4	2	4	2	2	14
Other risk factors	4	16	8	10	16	2	56
Clinical Signs							
Weakness(W)	4	16	8	16	22	2	68
Giddiness(G)	2	4	6	2	4	0	18
Blurring of Vision (B)	0	2	2	0	0	0	4
W,G	2	4	0	2	0	0	8
W,B	2	0	0	0	0	0	2
Speech	2	8	6	12	22	2	52
Cranial Nerves							
2	0	2	0	0	0	0	2
7	4	6	4	14	8	0	36
7,8	0	2	0	0	0	0	2
7,12	0	0	2	2	0	0	4
3,4,6	0	0	2	0	0	0	2
2,3,4,6	2	0	2	0	0	0	4
NIL	4	16	6	4	18	2	50

Table 4: Associated Symptoms, Etiology, Area and site of involvement

	Number (Percentage)
Associated Symptoms	
Speech abnormalities	52 (52%)
Drowsiness	20 (20%)
Ataxia	16 (16%)
Numbness	12 (12%)
Headache	6 (6%)
Vomiting	4 (4%)
Diplopia	2 (2%)
Loss of consciousness	2 (2%)
Etiology	
Atherosclerosis	40
Cardioembolic	16
Lacunar Infarct	8
Other Etiology	14
Unknown Etiology	22
Areas of involvement	
MCA	82
PCA	8
ACA	4
MCA + PCA	6
Sides of involvement	
Right	38
Left	60
Bilateral	2

CLINICAL PRESENTATION

There were varied clinical presentations among the patients in this study. Out of 100 patients, 68 of them presented with motor weakness of limbs over the involved side. 18 of them presented with giddiness. 6 patients had presented with blurring of vision whereas about 8 patients had presented with both weakness and giddiness to the Emergency Department (ED). One patient had presented with both weakness and blurring of vision.

Among the study patients, clinically other associated symptoms were accompanied apart from these main presenting symptoms of limb weakness, giddiness and blurring of vision. These included drowsiness, vomiting, speech abnormalities, numbness, headache, ataxia, diplopia and loss of consciousness. Among the associated complaints, 26 patients had speech abnormalities. About 20 patients were found to be drowsy at initial presentation

and 16 patients had ataxia at presentation to ED. 12 patients of total had numbness, 6 patients with complaint of headache and 4 had complaint of vomiting during presentation to ED. Out of total study population, only one had history of loss of consciousness.

Among the study population, 68 patients presented with weakness of limbs. Out of them, 2 had death as final consequence. 22 patients had severe disability. 16 patients and 8 patients had moderate and slight disability. 20 patients had complete recovery from stroke clinically, among which 4 patients were symptomatically free. About 18 patients presented with giddiness as main presenting symptom among them 4 patients had severe disability.

2 patient and 6 patients had moderate and slight disability. 6 patients had complete recovery from stroke clinically, among which 4 patients were symptomatically free. In the study group, 4 patients presented with blurring of vision as main presenting symptom. Out of them 2 had slight disability and 2 had complete recovery clinically and symptomatically?

In the group, 8 patients had presented with both weakness of limbs and giddiness as initial manifestation. Among them, one had moderate disability. 6 patients had complete recovery from stroke clinically, among which one patient was symptomatically free. And about one patient had presented with weakness and blurring of vision as initial manifestation. It was observed that this patient had complete recovery from stroke both symptomatically and clinically. Among the other etiology, involved in this study are hyperhomocystinemia (4 out of 16), antiphospholipid antibody syndrome (4 out of 16) and autoimmune causes (8 out of 16). In total, about 26 patients had hyperhomocystinemia, of which 22 had significant association with atherosclerosis causing arterial ischemic stroke in the study population.

Among 100 patients in the study, 82 patients were found to have stroke involving MCA territory. 8 patients were found to have AIS involving the PCA territory. 4 patients found to have involvement of ACA territory. Out of all, 6 patients had involvement of both MCA and PCA territories.

DISCUSSION

Stroke among young adults has been increasing in incidence in the recent times. In concordance with the other studies in India like Hussain M(2008)⁸, predominance of stroke was seen among males in study population (72 out of 100). The male preponderance seen in the present study is similar to other studies; however, studies also show nonsignificant sex differences in hemorrhagic stroke.¹⁰ Hospital-based studies from India revealed a high proportion of stroke in young ranging between 15% and 30%.¹¹ An overall male preponderance was seen. This is similar to data from Indian.¹² The male preponderance was seen in both ischemic and hemorrhagic stroke. Men with ischemic cerebral infarction, nonspecific stroke, or all types of stroke combined were at 21% to 35% higher risk of all-cause mortality than women.¹³ The mean age observed was 39 years, with highest incidence of stroke was seen in 4th decade accounting about 50% falling between the age group 41-45 years. HN Harsha Kumar (2011)⁹ also observed that stroke is more common (78 out of 109) among the 31–45 years category as compare with the <30 years category.

Smoking, alcoholism and dyslipidemia have been found to be significantly associated with stroke. HN Harsha Kumar (2011)⁹

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)⁸ 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 India¹² and Switzerland.¹⁴

Hyper homocystinemia 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 the young adults.

the combined defects of protein C or protein S deficiencies plus Factor V Leiden, or the acquirement of hyperhomocysteinemia with Factor V Leiden, increase the risk of thromboembolism compared to either defect in isolation. Therefore, the laboratory screening should be comprehensive and avoid missing the coexisting defect.¹⁵

Recurrence of stroke though was seen in 10%, but no mortality and less morbidity has been observed 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 cranial nerve palsy. Majority have left sided involvement associated with significant speech abnormalities, observed in this study. They have significant association with prolonged morbidity compared to that among right sided involvement. HN Harsha Kumar (2011)⁹ cases of embolic stroke mostly presented with loss of power in the limbs. Mostly (12 cases), they woke up in the morning and noticed loss of power. Headache was more common among hemorrhagic stroke

The proportion of hemorrhagic stroke and SAH is higher in the young (40%–55%),

In concordance with other studies Hussain M et al (2008)⁸ 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. The study postulated that the hypercoagulable state promoted the development of “red” fibrin thrombi in areas of stasis such as veins and heart chambers.¹⁶

Vitamin D deficiency also has contributory role among the individuals affected with stroke. With respect to a meta-analysis the risk of stroke was observed with Vitamin D deficiency among the study population due to its effect on the vasculature. It also has long term effect on morbidity among stroke patients. low serum 25(OH)D may be an independent risk factor for CVD in older Koreans.¹⁷ Thus, vitamin D intake and light exposure need to be increased. Most researchers have agreed that a serum 25(OH)D concentration of < 50 nmol/l is an indicator of vitamin D deficiency and a concentration of 51-74 nmol/l indicates vitamin D insufficiency¹⁸⁻²⁰.

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 frequently observed among the study group. Thrombosis was the main etiological association for stroke in young in this study. 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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Source of Support: Nil.

Conflict of Interest: None Declared.

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Cite this article as: Rakesh Kumar Soni, R. L. Meena, Neera Samar. A Hospital Based Study on Etiology and Clinical Profile of Stroke in Young Adults: From Southern Rajasthan. *Int J Med Res Prof*. 2020 July; 6(4): 84-89. DOI:10.21276/ijmrp.2020.6.4.019