



STUDY OF ETIOPATHOGENESIS AND TYPES OF STROKE AMONG YOUNG FEMALES

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ABSTRACT **BACKGROUND-**The present study was thus conducted to assess the etiopathogenesis and type of stroke in young women.

METHODOLOGY-The present study was conducted facility based observational Study at Department of Medicine, tertiary care centre, Bhopal for a period of 18 months on young females with stroke. Detailed history regarding presenting complaints was obtained from patients. Apart from this ECG, 2D echo, carotid artery doppler and CT scan was also done to study the type and cause of stroke.

RESULTS-The study included a total of 100 females in the age range of 12 to 45 years presenting with stroke. Most common etiology of stroke was cardiac (20%), pregnancy associated stroke (15%). SBP was significantly high in SDH patients followed by patients with IP bleed (154.32±39.06 mmHg).

CONCLUSIONS-Stroke is more prevalent in young working age women having history of rheumatoid heart disease, hypertension, pregnancy and tuberculosis. Infarction was the most common stroke type among the pregnant and postpartum women.

KEYWORDS : Stroke, Young Females, Pregnancy, Etiology, Types

INTRODUCTION

Stroke occurs as a result of interruption of blood supply to the brain; which can occur when blood vessel bursts or is blocked by a clot. This blockage or blood vessel burst in turn leads to poor or no supply of oxygen and nutrients to the brain, causing damage to the brain tissue. The effects of stroke depend on the anatomical area of brain affected. Stroke was defined by World Health Organization criteria as rapidly developing clinical signs of focal, at times, global disturbance of cerebral function lasting for more than 24 hours or leading to death with no apparent cause other than vascular origin. According to World Health Organization, a very severe stroke can cause sudden death.^[1,2] According to CDC, a stroke, also called a brain attack, results when blood flow to an area of the brain is cut off. Stroke is a medical emergency. Early and prompt management is important as delay in treatment increases the risk of permanent brain damage or death.^[3]

Stroke is one of the most important causes of high morbidity and mortality all over the world. Approximately one-fourth of all strokes occur in individuals with age group of less than 65 years whereas 1 out of 10 stroke cases occur at age of less than 50 years.^[4] Incidence of first stroke increases virtually exponentially with age in young people, with the steepest phase of increase beginning in early midlife.^[4]

Stroke in young has gained recent attention as the cases of strokes are on rise even among young. The incidence of stroke in people aged less than 50 years was estimated to be 10 per 100,000 inhabitants per year. It has been observed that ischemic stroke among women outnumber men among those with age less than 35 years whereas in those aged more than 35 years but less than 50 years, men outnumber women.^[4]

Data on stroke in young are not uniform as the age group included in the studies varies widely in the published reports. The present study was thus conducted to assess the etiopathogenesis and type of stroke in young women.

METHODOLOGY

The present study was conducted facility based observational Study at Department of Medicine, Gandhi Medical College, & associated Hamidia Hospital, Bhopal for a period of 18 months i.e. from 1st January 2018 to 30th June 2019. All the females whether married or unmarried belonging to age group of 12 to 45 years, diagnosed with stroke at the study area and study period were included whereas patient not giving consent, or belonging to age of <12 or >45, and presenting with traumatic injury were excluded from the study.

After obtaining ethical clearance from Institute's Ethical Committee, written consent was obtained from all the participants or guardians (if patient <18 years). Data regarding sociodemographic profile, and presenting complaints along with past history was obtained from all

the participants using pretested semi-structured questionnaire. Heart rate and blood pressure were also recorded for all the patients. All Blood samples were obtained from all the patients under aseptic precautions and were subjected to complete blood examination, coagulation studies, sickling test. Apart from this ECG, 2D echo, carotid artery doppler and CT scan was also done to study the type and cause of stroke.

STATISTICAL ANALYSIS-

Data compilation was done with the help of Ms Excel and analysis was done using IBM SPSS ver. 20 software. Frequency and percentage was calculated for grouped data whereas numerical data were expressed as mean and standard deviation. Chi Square test was applied to compare the categorical data. P value < 0.05 was considered significant.

RESULTS-

The study included a total of 100 females in the age range of 12 to 45 years presenting with stroke. In present study, majority of females with stroke presented at 21 to 30 years of age (36%) followed by 32% females belonging to 31 to 40 years of age. About 25% patients presented with Rheumatic heart disease whereas hypertension was observed in 17% females.

Table 1- Distribution according to investigations

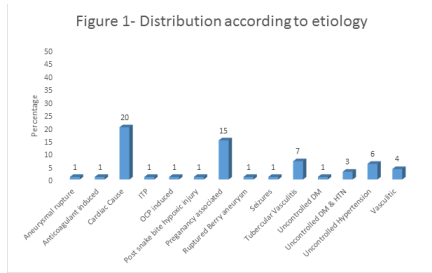
Investigations		Frequency (n=100)	Percent
ECG	AF	8	8.0
	LVH	16	16.0
	VPC	1	1.0
	Others	4	4.0
	WNL	71	71.0
Echo	Concentric Hypertrophy	2	2.0
	DCMP	1	1.0
	Hypokinesia & EF 54%	1	1.0
	LVH	2	2.0
	RHD	17	17.0
	MVR done no clot	2	2.0
	Stuck Valve	1	1.0
	WNL	74	74.0
Radio imaging findings	CVT	10	10.0
	Infarct	60	60.0
	IP bleed	22	22.0
	SAH	6	6.0
	SDH	1	1.0

Carotid artery Doppler	CCA thickening	1	1.0
	Left ICA flow reduced	1	1.0
	Left CCA Plaque	1	1.0
	WNL	97	97.0

Most common ECG finding among females with stroke was Left ventricular hypertrophy observed in 16% females followed by Atrial fibrillation in 8% females. RHD was the most common finding on Echo observed in 17% females whereas concentric hypertrophy was observed in 2% cases.

CT scan was suggestive of infarct and IP bleed in 60% and 22% cases respectively whereas carotid Doppler revealed CCA thickening, CCA plaque and reduced left ICA flow in 1% cases each.

Negative thrombophilia profile was reported in 2% patients, whereas hypertensive fundus, large arterial thickening, Hep B+ and ANA+ in 1% patients each.



Distribution of etiology revealed that 20% patients had stroke due to cardiac cause followed by pregnancy associated stroke (15%), and tubercular vasculitis (7%).

Table 2- Comparing Diagnosis with blood pressure and laboratory parameters

Diagnosis	SBP	DBP	Hb%	Platelets (lakh)	Blood Sugar (mg)
CVT (n=10)	125.60±17.3	83.40±11.3	9.27±1.4	2.19±0.8	92.50±16.0
INFARCT (n=60)	116.52±20.7	73.28±11.8	9.20±1.9	2.19±0.8	121.84±83.8
IP BLEED (n=22)	154.32±39.1	89.89±19.4	9.24±2.9	1.88±0.6	111.73±28.1
SAH (n=7)	142.86±30.9	87.14±14.9	9.20±0.9	1.92±0.8	116.42±46.4
SDH (n=1)	170.00	90.00	8.50	1.83	182.00
Total	126.66±29.6	78.22±15.3	9.24±1.9	2.09±0.7	116.79±67.4
Pvalue	<0.001	<0.001	0.942	0.476	0.870

Comparing the laboratory parameters, we found that SBP (p<0.001) and DBP (p<0.001) was significantly associated with different type of diagnosis. SBP was significantly high in SDH patients followed by patients with IP bleed (154.32±39.06 mmHg). However, no significant difference was observed in hemoglobin, platelet and blood sugar in different diagnosis.

Table 3- Association of diagnosis with age

Diagnosis	Age of patients				Total	Pvalue
	11-20	21-30	31-40	>40		
CVT	0(0)	6(6)	1(10)	3(30)	10 (100)	0.248
INFARCT	7 (1.6)	24 (40)	17	12 (20)	60 (100)	
IP BLEED	3 (13.6)	5 (22.7)	11 (50)	3 (13.6)	22 (100)	
SAH	1 (14.3)	2 (28.6)	3 (42.9)	1 (14.3)	7(100)	
SDH	0(0)	0(0)	0(0)	1(100)	1(100)	
Total	11 (11)	36 (36)	32 (32)	21 (21)	100 (100)	

The present study observed no statistically significant association of age with type of diagnosis (p>0.05).

DISCUSSION

Stroke was initially a common cause of morbidity as well as mortality in the developed world and largely thought of as a disease of the elderly. Pregnancy-associated stroke is rare but is considered an important cause of morbidity and mortality in women of childbearing age.^[5]

The present study aimed to study the etiopathogenesis and types of

stroke among young females. Strokes affected 36% females belonging to 21 to 30 years of age followed by 32% females in age range of 31 to 40 years. Hulliyappa D et al in their study on 236 stroke cases documented maximum strokes in 30 to 45 years of age (80%).^[6] Chandana et al observed that majority of strokes occur between the ages of 36-40 years (24%) and 34.5% of males were also affected in the same age group, whereas in females maximum cases occurred in the ages between 21-25 years (28.6%).^[7]

In present study majority of women i.e. 25% had history of rheumatic heart disease (RHD) followed by hypertension (17%), pregnancy (15%) and Takayasu's arteritis (2%). These findings were supported by Hussain Metal in which amongst patients with cardio-embolic stroke, the most common cardiac lesion was RHD (33.33%), followed by dilated cardiomyopathy (16.66%) and patent foramen ovale (16.66%). Takayasu's arteritis was detected in two patients, all of which were female. However, vasculitis was detected in two patients, which was due to systemic lupus erythematosus.^[8] However, Srivastava et al observed that hypertension and smoking were the most common risk factors in both young and elderly groups.^[9]

In our study, majority of the women were diagnosed with infarct (60%) followed by IP bleed (22%). About 10% females had CVT, 7% had SAH and 1% had SDH. These findings were similar to study by Jaigobin in which 34 patients with diagnosis of stroke were identified (21 infarctions and 13 hemorrhages) out of 50 females. Of patients with infarction, 13 were arterial and 8 were venous.^[10] Hussain et al found that 50.66% strokes were due to cerebral infarction, followed by intracerebral hemorrhage in 41.33%, subarachnoid hemorrhage in 4.66%, and cerebral venous thrombosis in 3.33%.^[8] Similar findings were recorded in study by Sheu et al, where out of 9132 sampled patients, 392 (4.3%) experienced ischemic stroke during the 3-year follow-up period, including 136 (6.0% of the tuberculous patients) from the study cohort and 256 (3.7%) from the comparison cohort.^[11]

LVH (13%) followed by AF (8%) were the most common ECG findings in present study. Pirinen J et al documented most common ECG abnormalities as T-wave inversions (16%), followed by left ventricular hypertrophy (LVH) (14%), prolonged P-waves (13%), and prolonged corrected QT interval (QTc) (12%).^[12] Similar findings were documented by Kumar Setal, where out of 122 patients, 19 patients (15.6%) had LVH as per ECG finding, 11 were (16.7%) of ischemic group and 8 (14.3%) of hemorrhagic group. Only 1 patient (0.8%) had RVH and also 1 patient (0.8%) had low voltage complex.^[13]

Most common ECHO finding in present study was RHD (17%). Two patients had concentric hypertrophy and 2 had LVH. While in the study by Ya'u A et al LVH was more prevalent. The most prevalent echocardiographic finding; found in 62% and 21% (P<0.01) of the cases and controls, respectively. Concentric LVH was found in 42% of the cases and 13% of controls, eccentric LVH in 23% of cases and 9% of the controls, while concentric remodeling was found in 5% of cases and 2% of controls (P<0.001, 0.002 and 0.272 respectively).^[14]

In our study, most common CT finding was infarction (60%) followed by IP bleed (22%). SAH was observed in 6% and CVT in 8%. However, Kumar L T et al in their study of 100 patients observed 69 patients had infarct, 21 patients had hemorrhage, 8 patients had CVT, 1 patient had SAH and 1 patient had normal scans.^[15] In present study, carotid Doppler was suggestive of CCA thickening, left ICA flow reduced and left CCA plaque in 1% cases each. Nakai et al documented global cerebral blood flow volume remained unchanged during pregnancy.^[16] In present study, SBP and DBP were significantly associated with SDH and IP bleed (p<0.01) whereas no association of blood parameters with type of strokes were found in present study. SBP is associated with higher risk of ischemic stroke in patients with uncontrolled hypertension on the other three blood pressure indexes. The risk of ischemic stroke was lower when SBP was less than 150 mmHg.^[17] José Casti llo recorded that for every 10 mmHg < 180 mmHg of SBP, the risk of early neurological deterioration, poor outcome, and mortality increased by 6%, 25%, and 7% respectively, whereas for every 10 mmHg > 180 mmHg, the risk of early neurological deterioration increased by 40% and the risk of poor outcome increased by 23%, with no effect on mortality.^[18]

Current study has some limitations like small study cohort, limited laboratory tests and it has not considered all the underlying risk factors. A larger randomized clinical trial is needed to provide strength to present

udy findings.

CONCLUSIONS-

Based on the findings of present study we conclude that stroke is more prevalent in young working women having history of rheumatoid heart disease, hypertension, pregnancy and tuberculosis. Infarction was the most common stroke type among the pregnant and postpartum women.

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