

Aetiology, Clinical Profile and Risk Factors of Young Stroke in Central India

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ABSTRACT

BACKGROUND

Stroke is disastrous particularly in young due to its immediate and long-term impact on victims, burden on their families and at large on the society. As the incidence of young stroke is increasing, we aimed to find out aetiology, clinical profile and risk factors of young stroke at Maharaja Yeshwant Rao Hospital, Central India.

METHODS

The present descriptive and clinical study was carried out in the Department of Medicine, M.G.M. Medical College and Maharaja Yeshwant Rao Hospital, Indore from Oct. 2013 to Oct. 2014 after approval from Institutional Ethics Committee. A total of 50 consecutive patients between 18-45 years of age presenting with stroke were recruited who were fulfilling inclusion criteria and exclusion criteria after taking prior informed consent.

RESULTS

Males (59%) were more commonly affected than females. Mean age of study population was 31.70±7.42 years and that of male and female patients was 33.03±7.131 and 29.85±7.237 years respectively and majority of stroke patients were in the age group of 36-40 years (26%). Motor deficit (90%) was most common clinical presentation. 78% patients suffered ischemic stroke. Most common aetiological factors were atherosclerosis (28%), smoking (40%), alcohol (32%) and hypertension (32%).

CONCLUSIONS

Smoking and alcohol are two leading modifiable risk factors found in our study, suggesting that increased public awareness and public health system interventions could reduce overall burden due to young stroke.

KEYWORDS

Young Stroke, Risk Factors, Smoking

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BACKGROUND

Stroke is the second most common cause of death worldwide and one of the leading causes of disability.¹⁻³ Stroke is rising in India and incidence registries using population-based surveillance have reported that the annual incidence of stroke varies from 100-150/100 000 population in urban locations with greater incidence in rural regions.⁴

METHODS

The present descriptive and clinical study was carried out at Department of Medicine, M.G.M. Medical College and Maharaja Yeshwant Rao Hospital, Indore, MP, India, from Oct. 2013 to Oct. 2014 after approval from Institutional Ethics Committee. A total of 50 consecutive patients between 18-45 years of age presenting with stroke were recruited who were full filling inclusion and exclusion criteria after taking prior informed consent. Patients with abrupt onset of focal or global neurological deficit attributable to vascular cause and persist for more than 24 hours. Patients who had head injury, Transient Ischemic Attack, brain tumour were excluded. Detailed history and clinical examination were done for all participants. All patients were subjected to brain imaging and relevant investigations available at our institute. Data analysis was done using Chi square test, Fisher Exact test and 90% Confidence Interval.

RESULTS

As shown in table 1, out of total of fifty patients, 29(59%) males and 21(42%) females diagnosed to have stroke. In this study, mean age of the study group was 31.70±7.42 years and that of male and female patients was 33.03±7.131 and 29.85±7.237 years respectively. The majority of strokes occurred between the ages of 36-40 years at 26% and 31.03% of male were also in the same age group, whereas in females it was in the ages between 21-25 years at 28.57%.

As shown in table 2, Patients had a number of clinical features in our study. 54% of the study population presented with headache. 28% of the study population presented with seizures. Decrease in consciousness was seen in 44% of patients. 40% of patients had speech abnormalities. The most common cranial nerve affected was the facial nerve in 40%. 4% of the patients had the abducens nerve affected and 4% of the study group had multiple cranial nerve palsies & 26% patients had normal cranial nerves on examination. Motor deficit was seen in all the patients. Hemiparesis, hemiplegia and monoparesis were seen in 76%, 14% and 2% of the study group respectively. Hemi sensory loss was seen in 14% of the study group. 6% of the patients had cerebellar deficit.

As shown in table 3, most common risk factor was smoking, which was present in 20(40%) patients. Second

most common risk factor for young stroke were alcohol and hypertension, both of which was present in 16(32%) patients. Other risk factors like diabetes mellitus, overweight, coronary artery disease (CAD), transient ischemic attack (TIA), family history of stroke, OCP uses and hyperhomocysteinaemia were present in 12(24%), 8(16%), 3(6%) 1(2%), 1(2%), 3(6%) and 6(12%) respectively.

Age in Years	Female		Male		Combined	
	No.	%	No.	%	No.	%
18-20	1	4.76	2	6.89	3	6
21-25	6	28.57	3	10.34	9	18
26-30	4	19.04	3	10.34	7	14
31-35	3	14.28	6	20.68	9	18
36-40	4	19.04	9	31.03	13	26
41-45	3	14.28	6	20.68	9	18
Total	21	100.0	29	100.0	50	100.0
Mean ± SD	29.85 ± 7.237		33.03 ± 7.131		31.70 ± 7.42	

Table 1. Age and Sex Distribution

Sl. No.	Clinical Features	Number (n=50)	%
1.	Headache	Absent	23
		Present	27
2.	Seizures	Absent	36
		Present	14
3.	Consciousness	Normal	28
		Decreased	22
4.	Speech	Normal	25
		Dysphasia	20
		Could not be examined	5
5.	Cranial Nerve Deficit	Normal	26
		Lateral rectus	2
		Facial	20
		Multiple	2
6.	Motor Deficit	Normal	4
		Hemiparesis	38
		Hemiplegia	7
		Monoparesis	1
7.	Sensory Deficit	Normal	41
		Hemi sensory loss	7
		Could not be examined	2
8.	Cerebellar Deficit	Absent	46
		Present	3

Table 2. Clinical Features of Stroke

Sl. No.	Risk Factors	Number	%
1.	Smoking	Absent	30
		Present	20
2.	Alcohol	Absent	34
		Present	16
3.	Hypertension	Absent	34
		Present	16
4.	Diabetes Mellitus	Absent	38
		Present	12
5.	BMI	Under weight	6
		Normal	36
		Over weight	8
6.	CAD	Absent	47
		Present	3
7.	TIA	Absent	49
		Present	1
8.	Family History of Stroke	Absent	49
		Present	1
9.	OCP	Absent	47
		Present	3
10.	Homocysteinaemia	Absent	44
		Present	6

Table 3. Risk Factors Associated with Stroke

Sl. No.	Risk Factors		ICH (no=11)	Ischemic (no=39)	P
1	Smoking	Absent	5 (45.45)	25 (64.10)	0.311
		Present	6 (54.54)	14 (35.89)	
2	Alcohol	Absent	6 (54.54)	28 (71.79)	0.297
		Present	5 (45.45)	11 (28.20)	
3	BMI	Under weight	1 (9.09)	5 (12.82)	>0.05
		Normal	9 (81.81)	27 (69.23)	0.292
		Overweight	1 (9.09)	7 (17.94)	0.317
4	Diabetes Mellitus	Absent	6 (54.54)	32 (82.05)	0.105
		Present	7 (63.63)	5 (12.82)	
5	Hypertension	Absent	4 (36.36)	30 (76.92)	0.024**
		Present	7 (63.63)	9 (23.07)	
6	CAD	Absent	11 (100)	36 (92.30)	1.00
		Present	0 (0)	3 (7.69)	
7	TIA	Absent	11 (100)	38 (97.43)	> 0.05
		Present	0 (0)	1 (2.56)	
8	Family history of stroke	Absent	11 (100)	38 (97.43)	0.220
		Present	0 (0)	1 (2.56)	
9	OCP	Absent	11 (100)	36 (92.30)	0.343
		Present	0 (0)	3 (7.69)	
10	Homocystin-aemia	Absent	11 (100)	33 (84.61)	0.317
		Present	0 (0)	6 (15.38)	

Table 4. Risk Factors Associated with Various Types of Stroke

As shown in table 4, multiple risk factors were analysed in our study. 40% of all the patients were smokers and among ischemic and haemorrhagic strokes 35.89% and 54.54% ($P > 0.05$) were smokers respectively. Alcohol consumption was seen in 32% of patients and among ischemic strokes 28.2% and haemorrhagic strokes 36.4% ($p = 0.297$). 16% of the study group was overweight. Among ischemic strokes 15.4% whereas none of the haemorrhagic strokes were overweight ($p = 0.317$).

Diabetes mellitus was seen in 24% of patients. 12.82% of ischemic strokes were diabetic whereas 63.63% of haemorrhagic strokes had the same disease ($p = 0.106$). Hypertension and CAD were seen in 32% and 6% of the study group respectively. Among ischemic strokes 23.07% ($p < 0.001$) were hypertensive and 7.69% ($p = 0.662$) had CAD. Whereas among haemorrhagic strokes 63.63% ($p < 0.001$) had hypertension and none had CAD.

Transient ischemic attacks and previous family history of stroke were both seen in 2% of the study group. 2.6% ($P > 0.05$) of ischemic strokes also had the same, none of the haemorrhagic strokes had this history. 4% of patients were taking oral contraceptive pills. 7.69% of ischemic and non-haemorrhagic stroke patients were taking the same. Homocysteine levels were seen elevated in 12% of patients, 15.4% ($p = 0.317$) ischemic strokes had homocystinaemia, none of the haemorrhagic strokes had this risk factor. One of the patients had this as a single risk factor.

DISCUSSION

Our study was based in central India comprising of patients admitted in Maharaja Yeshwant Rao Hospital, Indore, mostly referred from rural areas. It should prove useful, then, for the diagnosis, management and prognosis of young stroke patients in similar areas. Sex ratio in our study was 1.3:1 (male: female). Mehndiratta MM et al⁵ showed a ratio of 1:08 in north India, whereas Zunni et al⁶ demonstrated a

similar ratio of 1.2:1 in Africa. The mean age of all the patients in our study was 31.70 years, a study in north India by Mehndiratta MM et al showed a similar mean age of 31.97 years. The mean ages of males and females were 30.66 and 33.28 years. Our study had a markedly higher mean age group among men at 33.03 years whereas among women it was much lower at 29.85 years probably because there were more female participants in the present study who presented with CVT in early age.

Study done by Bansal et al⁷ showed hemiparesis was observed in 79.2%. Speech difficulty in 30.4%, decreased level of consciousness in 57.2%, seizures 28.6%. These abnormalities concurred with the present study. Nagaraja et al⁸ had showed an incidence of smoking associated with stroke to be 15%, Dalal et al⁹ 40%, Bogouslavsky et al¹⁰ 36.6% and Alvarez et al¹¹ 56.7%. In meta-analysis of 32 separate studies of relation between smoking and stroke analysed Risk factors by Roger Shinton and Beevers¹² there was a strong association between smoking and incidence of stroke. Our study showed 40%. In the study of Nagaraja et al the frequency of alcohol consumption was 15%, Alvarez et al 37.8% and Dalal et al 40%, the present study had 32%. In study by Nagaraja et al the incidence of diabetes was 11%, Dalal et al 20%, Grindal et al¹³ 5.2%, Zunni et al 14.8% and Alvarez et al 10.9%, whereas in our study it was 24%. In the present study 16 patients (32%) had hypertension Dalal et al showed an incidence of 46.7%, Alvarez et al 23%, Nagaraja et al 22.6% and Grindal et al 17.2%. With respect to CAD, Grindal et al showed a frequency of 26%, Alvarez et al 3.9%, our study showed 6%. In the study by Bogouslavsky et al the incidence of TIA was 17.1% whereas 3% in Mehndiratta MM et al which concurred with our study of 2%. In a study by Grindal et al the incidence of OCP's leading to stroke was 17.9% whereas in our study it was 6% possibly because of the rural population.

In the study by Mehndiratta MM et al incidence of homocystinaemia was 0.9%. Present study showed 12% which did not concur with the above study probably because the levels of homocysteine can elevate temporarily after stroke, so it should be measured again after 8 weeks.¹⁴ In the present study homocysteine was measured during presentation of stroke. In the present study smoking was present in 35.89% of ischemic strokes and 54.54% of haemorrhagic strokes whereas it was 18.11% and 4.72% in ischemic and haemorrhagic strokes respectively in Mehndiratta MM et al. In the study by Alvarez et al it was present in 56.74% of ischemic strokes.

In the present study alcohol consumption was present in 28.20% of ischemic strokes and 45.45% of haemorrhagic strokes where as it was 16.7% and 28.26% in ischemic and haemorrhagic strokes respectively in Bevan et al.¹⁵ Diabetes was present in 12.82% of ischemic and 63.63% of haemorrhagic strokes in present study whereas it was 3.96% and 2.36% in ischemic and haemorrhagic strokes respectively in Mehndiratta MM et al. This did not concur with the present study probably because the incidence of Diabetes Mellitus was less in Mehndiratta MM et al. In the

present study hypertension was present in 23.07% of the ischemic and 63.63% of haemorrhagic strokes whereas it was 16.53% and 3.14% in ischemic and haemorrhagic strokes respectively in Mehndiratta MM et al. This did not concur with the present study probably because there were number of risk factors present in the same patients diluting the effect of single risk factor.

In the present study CAD was present in 7.69% of the ischemic and none of the haemorrhagic strokes whereas it was 6.29% and 0.78% in the same in Mehndiratta MM et al. History of TIA was present in 2.56% of the ischemic stroke and none in the haemorrhagic stroke whereas Mehndiratta et al showed an incidence of TIA in the same as 7.87% and none in haemorrhagic stroke. 7.69% of the ischemic and none of haemorrhagic strokes patients had history of consumption of OCP's whereas it was 18.75% in ischemic stroke and none in haemorrhagic stroke in study done by Bevan et al. Present study did not concur with the above study probably most of patients admitted in our hospital were referred from rural areas.

Our study showed a high occurrence of dyslipidaemia in the form of elevated LDL and decreased HDL. Mehndiratta MM et al showed abnormal cholesterol and triglycerides levels as a risk factor. Albucher JF et al¹⁶ showed by multivariate analysis that HDL was the only one to be highly associated with stroke. Atherosclerosis had emerged as the main aetiological factor responsible for 28% of the patients in our study. Atherosclerosis was considered based on the criteria similar to Adams et al¹⁷ when the patient had 2 or more risk factors for atherosclerosis in the absence of identifiable causes. Bevan et al showed 31%. In a case control study at NIMHANS by Dakshinamurthy,¹⁸ it was found that 50% of stroke in young could be attributed to atherosclerosis.

Hypertension is the etiological factor in 20% of the patients, Dalal et al showed an incidence of 40%. CVT was seen in 9 patients (18%). This does not concur with the study by Venkataraman et al¹⁹ where incidence was 4.3%, but Toubin²⁰ found CVT in 9% of 182 consecutive autopsies. Bousser et al²¹ trial suggests that the true incidence is much higher than that thought from autopsy series. Tubercular meningitis comprised of 18% of cases which is higher in comparison to Mehndiratta MM et al. But in a study by Grau AJ et al²² showed an incidence of 19.2% which concurred with the present study. RHD leading to cardio embolic stroke comprised 6% of the cases. In a study by Mehndiratta MM et al showed 30%. Bansalet al showed an incidence of 16%. Present study had a smaller number of cases of RHD in comparison to other Indian studies probably because of small study group and number of females who were there in study group presented with CVT.

In the present study, 1 patient (2%) was diagnosed to have SLE. In the study by Mehndiratta MM et al the incidence was 1.8%. Aetiology was undetermined in 8% of the cases. In a study by Mehndiratta MM et al the undetermined cases were 10.09%. Present study had fewer numbers of undetermined cases probably because of a smaller study group.

Ischemic infarcts were noted frequently in 30(60%) patients. 18(60%) patients had MCA infarct, 1(3.33%) had lacunar infarcts, 1(3.33%) had PICA infarcts, 2(6.66%) had PCA infarct, 1(3.33%) had ACA infarct and 7(23.33%) had multiple infarcts. Intracerebral haemorrhage was seen in 11(22%) patients. 3(27.27%) patients had haemorrhage, involving MCA territory, 5(45.45%) patients had haemorrhage involving basal ganglia, 2(18.18%) patients had in thalamo-capsular region and 1 (9.09%) had in cerebellar region. Rajeh SA et al²³ in their study had found ischemic infarction in CT in 76.2% and haemorrhage in 23.8% of the stroke in young. Cortical venous thrombosis was seen in 9(18%) patients, who all were females. 8(16%) females were postpartum & 1(2%) female had APLA syndrome. In a study by Venkataraman et al who evaluated 69 patients less than 40 years with stroke, the incidence of CVT was 4.3%.

Special haematological investigations like antithrombin III, protein C, protein S deficiencies and angiographic studies could not be done in the present study. Evaluations of various risk factors of stroke in young are important as they may play a major role in predisposing an individual to a disease which has terrible impact on the family and society. Stroke in young deserves an extensive evaluation that includes haematological, biochemical and angiographic studies. By these approaches a large number of potential causes can be detected and the treatment of these patients can be tailored according to the outcome.

CONCLUSIONS

Smoking and alcohol are two leading modifiable risk factors found in our study, suggesting that increased public awareness and public health system interventions could reduce the overall burden due to young stroke.

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