Research Article

Study of incidence of ischemic stroke due to intracranial, extracranial and combined vascular lesions and associated risk factors

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Abstract

Introduction: Ischemic Cerebrovascular disease (ischaemic stroke) is a leading public health problem. Stroke is defined as an abrupt neurologic deficit that is attributable to focal vascular cause. Risk factors for stroke include hypertension, carotid stenosis, atrial myxomas, smoking, hyperlipidemia, diabetes, myocardial infarction and atrial fibrillation. **Aims and objectives:** To study the incidence of ischaemic stroke due to intracranial, extracranial and combined vascular lesions. **Material and Method:** in the present study 104 cases of ischemic stroke were included in the study. All these patients were studied clinically and radiologically to study the nature of lesion (intracranial or extracranial vascular lesion). Neuroimaging- MRI-Brain or CT-Brain was done in each patient to see site of infarct. **Results:** It was observed that out of 104 patients included in our study, 28.84% patients were having intracranial vascular lesion, 31.73% patients were having extracranial vascular lesion and 7.69% patients were having combined intracranial and extracranial vascular lesions. 31.73% patients were having normal angiographic study. Incidence of stroke increases with increasing age and has male preponderance. Hypertension was found in 76.92% of total patients. 41.35% of patients in our study were having diabetes mellitus. History of smoking was observed in 33.65% of patients. **Conclusion:** The incidence of stroke due to intracranial, extracranial and combined vascular lesion was 28.84%, 31.73% and 7.69% respectively. Increasing age, male sex, HTN, DM, IHD, past history of stroke and smoking were important risk factors for ischaemic strokes.
Keywords: ischemic stroke, risk factors.

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INTRODUCTION

Ischemic Cerebrovascular disease (ischaemic stroke) is a leading public health problem. Stroke is second to heart disease as a worldwide cause of death. In the United States, stroke is the third most common cause of death; following heart disease and cancer.[1] Approximately 750,000 Americans have an initial or recurrent ischaemic stroke per year.[2] For India, community survey have shown a crude prevalence rate for hemiplegia in the range of 200 per 100000 persons, nearly 1.5 percent of all urban hospital admission, 4.5% of all medical and around 20% of all neurological cases.[3] A stroke is rapidly developing clinical symptoms and / or signs of focal, and at times global (applied to patients in deep coma and to those with SAH) loss of brain function with symptoms lasting more than 24 hrs or leading to death, with no apparent cause other than that of vascular origin.[4] Thus, the definition of stroke is clinical and laboratory studies including brain imaging are used to support the diagnosis. The clinical manifestations of stroke are highly variable because of the complex anatomy of the brain and its vasculature.[5] Among all the neurologic diseases of adult life, the stroke clearly rank first in frequency and importance accounting up to 20% of all central nervous system disorders, in the urban sectors of India. Stroke is defined as an abrupt neurologic deficit that is attributable to focal vascular cause. Risk factors for stroke include hypertension, carotid stenosis, atrial myxomas, smoking, hyperlipidemia, diabetes, myocardial infarction and atrial fibrillation.

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AIMS AND OBJECTIVES

To study the incidence of ischaemic stroke due to intracranial, extracranial and combined vascular lesions.

MATERIAL AND METHOD

The present cross sectional study was conducted at Ruby Hall Clinic, Pune. Following inclusion and exclusion criteria was used to select the study subjects.

Inclusion criteria

All the patients admitted to Ruby Hall Clinic, Pune with sudden onset neurological deficit and diagnosed to have TIA, ischaemic stroke or leukoaraiosis are included in this study.

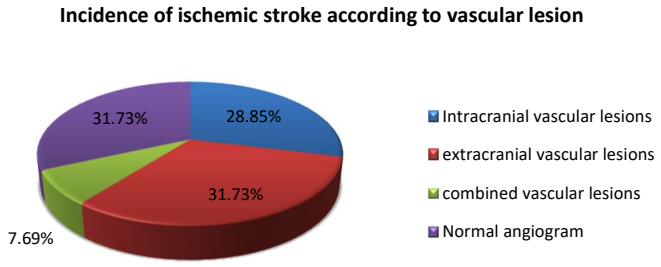
Exclusion criteria

All cases suggestive of cardio-embolic stroke and haemorrhagic stroke are excluded from this study. By using the above mentioned inclusion and exclusion criteria total 104 patients of were enrolled in the study in one year. Detailed case history was taken for each patient regarding history of current illness; past history of similar events, treatments, transient ishaemic attacks and history suggestive of risk factors like hypertension, Diabetes mellitus, ischaemic heart disease, old stroke and smoking history was noted. General examination and systemic examination was performed on each patient. Detailed neurological examination was done to localise site of lesion. Cardiovascular examination was done to rule out any cardiac disease leading to embolisation and stroke. All these patients were studied clinically and radiologically to study the nature of lesion (intracranial or extracranial vascular lesion). Neuroimaging- MRI-Brain or CT-Brain was done in each patient to see site of infarct. Patients with haemorrhagic stroke and venous sinus thrombosis are excluded. Subsequently CT-angiogram, MR-angiogam or Digital substraction Angiography was done to study site of occlusion in vessels. Lesion which is not causing any symptoms or signs is considered as normal. Accordingly clinical and radiological correlation of strokes due to intracranial and extracranial vascular lesion and associated risk factors like smoking, hypertension, Diabetes mellitus, IHD were studied.

RESULTS

Table 1: Incidence of ischemic stroke according to vascular lesion

Site	No. of patients	Percentage
Intracranial vascular lesions	30	28.85
extracranial vascular lesions	33	31.73
combined vascular lesions	8	7.69
Normal angiogram	33	31.73
Total	**104**	**100.00**



It was observed that out of 104 patients included in our study, 28.84% patients were having intracranial vascular lesion, 31.73% patients were having extracranial vascular lesion and 7.69% patients were having combined intracranial and extracranial vascular lesions. 31.73% patients were having normal angiographic study. Out of 33 patients with normal angiographic study were having leukoaraiosis.

Table 2: Association of age and sex with ischaemic stroke

		Intracranial vascular lesions	Extracranial vascular lesions	Combined vascular lesions	Normal angiogram	Total
Age group in years	10-20	01 (3.33%)	01 (3.03%)	00 (0.00%)	00 (0.00%)	02 (1.92%)
	21-30	01 (3.33%)	02 (6.06%)	00 (0.00%)	02 (6.06%)	05 (4.81%)
	31-40	01 (3.33%)	03 (9.09%)	01 (12.50%)	04 (12.12%)	09 (8.65%)
	41-50	04 (13.33%)	07 (21.21%)	02 (25.00%)	05 (15.15%)	18 (17.31%)
	51-60	09 (30.00%)	07 (21.21%)	03 (37.50%)	12 (36.36%)	31 (29.81%)
	61-70	08 (26.67%)	09 (27.27%)	02 (25.00%)	05 (15.15%)	24 (23.08%)
	71-80	04 (13.33%)	03 (9.09%)	00 (0.00%)	04 (12.12%)	11 (10.58%)
	81+	02 (6.67%)	01 (3.03%)	00 (0.00%)	01 (3.03%)	04 (3.85%)
Sex	Males	21 (70.00%)	23 (69.70%)	06 (75.00%)	23 (69.70%)	73 (70.19%)
	Females	09 (30.00%)	10 (30.30%)	02 (25.00%)	10 (30.30%)	31 (29.81%)

It was observed that age was a significant risk factor for stroke. The age of patients ranged from 15 yrs to 86 yrs. Majority of the patients were between 50-60 yrs (29.81%) and between 60-70 yrs (23.08%). Total number of male patients was 73 and female patients were 31 and the male to female ratio was 2.35:1.

Table 3: Association of various risk factors with ischaemic stroke

		Intracranial vascular lesions	Extracranial vascular lesions	Combined vascular lesions	Normal angiogram	Total
Hypertension	HTN	25 (83.33%)	25 (75.76%)	7 (87.50%)	23 (69.70%)	80 (76.92%)
	Non-HTN	5 (16.67%)	8 (24.24%)	1 (12.50%)	10 (30.30%)	24 (23.08%)
Diabetes	DM	15 (50.00%)	15 (45.45%)	1 (12.50%)	12 (36.36%)	43 (41.35%)
	Non-DM	15 (50.00%)	18 (54.55%)	7 (87.50%)	21 (63.64%)	61 (58.65%)
Ischaemic stroke	h/o IHD	8 (26.67%)	17 (51.52%)	2 (25.00%)	8 (24.24%)	35 (33.65%)
	No h/o IHD	22 (73.33%)	16 (48.48%)	6 (75.00%)	25 (75.76%)	69 (66.35%)
CVA	h/o CVA	7 (23.33%)	4 (12.12%)	1 (12.50%)	3 (9.09%)	15 (14.42%)
	No h/o CVA	23 (76.67%)	29 (87.88%)	7 (87.50%)	30 (90.91%)	89 (85.58%)
Smoking	h/o smoking	10 (33.33%)	12 (36.36%)	3 (37.50%)	10 (30.30%)	35 (33.65%)
	No h/o smoking	20 (66.67%)	21 (63.64%)	5 (62.50%)	23 (69.70%)	69 (66.35%)

Hypertension appears to be an important risk factor for stroke. Hypertension was found in 76.92% (80 out of 104) of total patients. 83.33% of stroke patients in our study with intracranial vascular lesion were having hypertension, 75.76% patients with extracranial vascular lesion were having hypertension, 87.5% patients with combined intracranial and extracranial vascular lesions were having hypertension and 69.7% of stroke patients with normal angiogram were having hypertension. HTN has positive correlation with intracranial vascular lesions as compared to extracranial vascular lesions, but difference is not stastistically significant (p=0.53). 41.35% of patients in our study were having diabetes mellitus. 50% of patients with intracranial vascular lesion were diabetic, 45.45% patients with extracranial vascular lesion were diabetic, 12.5% patients with combined lesion were diabetic and 36.36% of stroke patients with normal angiogram were diabetic. 33.65% of stroke patients in our study were having past history of ischaemic heart disease. 14.42% of patients in our study were having history of prior stroke. History of smoking was observed in 33.65% of patients. It was observed that 33.33% of patients with intracranial vascular lesion, 36.36% patients with extracranial vascular lesion, 37.5% of patients with combined vascular lesion and 30.30% of ischaemic stroke patients with normal angiographic study were having history of smoking.

DISCUSSION

The Present observational cross sectional study was conducted on 104 patients admitted in Ruby Hall Clinic, Pune with sudden onset neurological deficit and diagnosed to have ischaemic stroke. Out of 104 patients, 30 patients were diagnosed to have intracranial vascular lesion, 33 patients extracranial vascular lesions, 8 patients with combined intracranial and extracranial vascular lesions and 33 patients were having normal angiographic study. It was observed that age an important risk factor for ischaemic stroke. Our patients ranged between 15-86 yrs of age. Maximum number of patients 29.81% was between 50-60 age group followed by 23.08% in 60-70 yrs age group. Brown *et al*[6] and Wolf *et al*[7] also mentioned that chances of stroke increase with increasing age. Out of 104 patients included in our study, 28.84% patients were having intracranial vascular lesion, 31.73% patients were having extracranial vascular lesion, 7.69% patients were having combined intracranial and extracranial vascular lesions and 31.73% patients were having normal angiographic study. P.M.Dalal *et al*[3] in their study showed that 15% stroke was due to intracranial vascular lesion and 33% due to extracranial lesion. Another Indian study by Varadlaxmi *et al*[8] mentioned that 28% patients with intracranial lesions. Liu HM *et al*[9] in a study in Taiwan have found that 32.4% patients with ischaemic stroke were having normal angiogram. One study by Farhad *et al*[10] had found 47% patients with extracranial vascular lesion and 27% patients with extracranial vascular lesion. In the present study male to female ratio was found to be 2.35:1 with 73 males and 31 females out of 104 patients. Similar observation was reported Uddin *et al*[11] (2.57:1).in the contrary Raph *et al*[12] observed male to female ratio 1.25:1. Hypertension appears to be an important risk factor for ischaemic stroke. Hypertension was found in 76.92% of total stroke patients. According to one study published in 1997 based on Taiwan stroke registry, hypertension was present in 69% cases of stroke[13]. Shrivastava *et al*[14] also observed 67% of stroke patients were having hypertension. In our study, 83.33% patients with intracranial vascular lesion were having hypertension. Berne *et al*[15] also states that hypertension is an independent risk factor for intracranial stenosis. It was observed that 41.35% patients were having diabetes mellitus. Ralph *et al*[12] also observed diabetes as an independent risk factor for ischaemic stroke. It was also observed that 50% patients with intracranial strokes have diabetes. Similar observations' were also reported by Rincon F[16]. IHD has long been recognized as a risk factor for ischaemic stroke and 33.65% of patients in our study were having IHD. According to Framingham study[17], risk

of stroke doubled with IHD. In our study, 14.42% patients were having prior history of stroke. Katzan *et al*[18] and Burn *et al*[19] mentioned that stroke survivors are at increased risk of recurrent stroke. Association of smoking with ischaemic stroke was also studied in th eoresent study. It was observed that 33.6% of patients were smokers. Shinton R[20] showed that smoking increases risk of ischaemic stroke nearly two times. In our study, smoking was associated with increased risk of intracranial vascular lesion. Sacco *et al*[21] and Caplan *et al*[22] also showed association of smoking and intracranial vascular disease.

CONCLUSION

The incidence of stroke due to intracranial, extracranial and combined vascular lesion was 28.84%, 31.73% and 7.69% respectively. Increasing age, male sex, HTN, DM, IHD, past history of stroke and smoking were important risk factors for ischaemic strokes. HTN, DM and smoking are found to be important risk factor for ischaemic stroke due to intracranial vascular lesion.

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