



“STUDY ON CLINICAL PROFILE & RISK FACTORS OF STROKE PTS AND ASSESSMENT OF COGNITIVE IMPAIRMENTS WITH INVOLVED STROKE TERRITORY.”

General Medicine

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ABSTRACT

Background & Objectives: The purpose of this study was to find out occurrence of different clinical presentations of stroke pts & presence of different risk factors among them. Post stroke cognitive function impairment is not well evaluated. So we looked for incidence of cognitive impairment & predominantly affected cognitive domain among stroke victims as per involved territory of stroke.

Materials & Methods: This observational cross sectional study was conducted in a tertiary medical institution, Malda Medical College & Hospital, West Bengal, between 1.1.2019 to 31.5.2019, after obtaining ethical clearance from Institutional Ethical Committee. Prestructured proforma was used to get details of demographic profile & co morbidities of stroke pts after obtaining consent. All routine tests & imaging were carried out to establish accurate location of lesion & stroke subtypes. Cognitive assessment was done after stabilization of the pts using Addenbrooke's Cognitive Examination (ACE-III).

Results: Out of 120 stroke pts, 70pts (58.33%) were males. The predominant age group affected by stroke in the study was above 65yrs of age (46.66%). The most predominantly found risk factors in this study was hypertension that was present in 90cases (75%). The second most common risk factor was dyslipidemia in 84cases (70%). Type 2 diabetes was present in 72 cases (60%). Large artery atherosclerosis was responsible for stroke in 31 cases (39.74%). Overall cognitive impairment was found in 45 pts (37.5%). Most commonly affected cognitive domain was language. Memory was most commonly affected cognitive domain in multi infarct strokes (80% cases).

KEYWORDS

Cerebrovascular accident, Hypertension, Diabetes mellitus, Dyslipidemia.

INTRODUCTION

Stroke remains the most common life-threatening neurological disease globally and impacts individuals, their families and society.^{1,2} It is the leading cause of disability among elderly and the second leading cause of mortality worldwide.³ Stroke is responsible for millions of deaths in developing countries, and is the major cause of mortality and morbidity in Asian countries.⁴ Treatment options are limited to thrombolysis, but only few patients receive this treatment owing to restrictions in application time and indication. Thus primary prevention remains the most important general strategy for reducing the impact of stroke. Several well-established modifiable risk factors for stroke are hypertension (HTN), smoking, cardiac disease, diabetes etc. Stroke appears to be a preventable disease to a large extent change in lifestyle is supposed as the major primary prevention strategy. The aim of the present study is to identify the prevalence of common modifiable risk factors (demographic and cardiovascular) for stroke in India. Documentation of prevalence & incidence of cognitive dysfunction among stroke subjects has remained limited globally. Spectrum of cognitive impairment after stroke ranges from aphasia, mild cognitive impairment to frank dementia.⁵ Frequency of it varies from hospital to community based studies. Hospital based studies document a higher frequency due to preferential admission of more severe cases. The frequency of cognitive dysfunction varies from 37.5% at 12 months in longitudinal community based study¹² to 51.5% over the same period in a hospital based study.⁶ This discrepancy in findings is due to various methodologies, wide group of people & ethnic group studied, utilization of different operational definitions, use of different assessment tools and diverse study designs. So far we are mostly concerned with physical disability resulting from stroke but cognitive function impairment is not well evaluated though it has got significant impact in the rest of their life. So we looked for incidence of cognitive impairment & predominantly affected cognitive domain among stroke victims as per involved territory of stroke.

MATERIALS & METHODS:

This observational cross sectional study was conducted in a tertiary medical institution, Malda Medical College & Hospital, West Bengal, between 1.1.2019 to 31.5.2019, after obtaining ethical clearance from Institutional Ethical Committee. Prestructured proforma was used to get details of demographic profile & co morbidities of stroke pts after obtaining consent. Out of admitted 500 stroke pts during this time period, 120 pts were recruited in this study as in rest of the pts we could not carry out necessary investigations to establish etiology of stroke & assessment of cognitive function could not be possible either due to low GCS or death on the day of admission. All routine tests and ECG, Echocardiography, Coagulation profile, Homocysteine level and appropriate imaging modalities like

CT scan, MRI, Carotid & Vertebral artery doppler study were carried out to establish accurate location of lesion & stroke subtypes. The causes of ischemic stroke was classified according to TOAST criteria. Cognitive assessment was done after stabilization of the pts using Addenbrooke's Cognitive Examination (ACE-III) where cognitive function of the brain was assessed in the following domains- orientation & attention, language, memory, visuospatial. Cut-off value <82 out of total 100 was considered as cognitive impairment. Cut-off value 82 gives 84% sensitivity & 100% specificity for dementia.

STATISTICAL ANALYSIS

Variables were analyzed by finding their frequencies, percentages or odds ratio. IBM SPSS version 22 was used for necessary statistical analysis.

RESULTS:

Out of 120 stroke pts, 70pts (58.33%) were males and 50pts (41.66%) were females. The predominant age group affected by stroke in the study was above 65yrs of age (46.66%) and approximately one fifth of the study population was below 55 yrs of age. Positive family history of stroke was present in 28cases (23.3%). More than half of the study population (60%) were habituated to sedentary life style. The smoking history was present in 55cases (45.83%). [Table-1]

Table 1: Demographic Profile Of Study Population

Variables	No	Percentage
AGE -	<40 Years	4 3.33
	40-55 Years	20 16.66
	56-65 Years	40 33.33
	>65 Years	56 46.66
SEX -	Male	70 58.33
	Female	50 41.66
RESIDENCE -	Rural	40 33.33
	Urban	80 66.66
EDUCATIONAL LEVEL -	Illiterate	45 37.5
	Primary Education	50 41.66
	Secondary & above	25 20.83
SUBSTANCE ABUSE -	Smoking	55 45.83
	Alcohol	30 25
	Chewing Gutkha	15 12.5
Family H/O Stroke-	28	23.33

The most predominantly found risk factors in this study was hypertension that was present in 90cases (75%). The second most common risk factor was dyslipidemia in 84cases (70%) and most commonly observed abnormality in lipid profile was isolated low level of HDLc followed by high triglyceride level. Type 2 diabetes was

present in 72 cases(60%)and most of them had uncontrolled glucose parameters.More than half of the study population (65%) were either overweight or obese as per ethnic BMI cut-off.Nonvalvular atrial fibrillation was responsible for cardioembolic stroke in 12 cases(10%) [Figure-1]

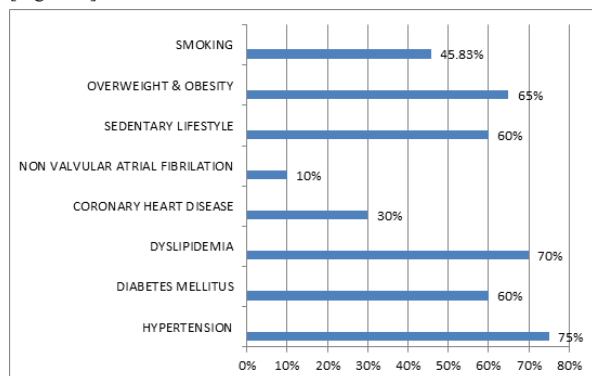


Figure 1: Comorbidities & Risk Factors

The incidences of ischemic stroke subtypes in present study as per TOAST classification were as follows,large artery atherosclerosis was responsible for stroke in 31 cases(39.74%),small artery occlusion resulting lacunar strokes in 24 cases(30.76%),nonvalvular atrial fibrillation causing cardio embolic stroke in 9 cases(11.55%).Other determined etiology like hypercoagulable state,large artery vasculitis etc were responsible for 5.12% cases and etiology could not be arrived in 10 cases(12.82%) with the available investigational modalities. (Figure-2a)

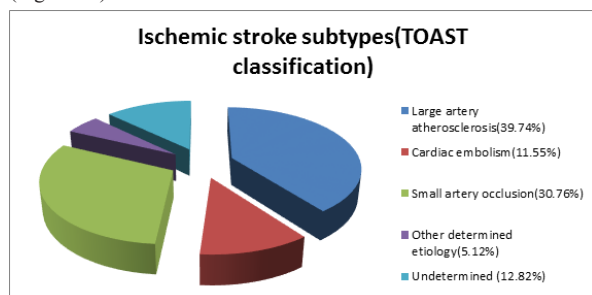


Figure 2a: Ischemic Stroke Subtypes

Among the hemorrhagic stroke,25 cases(59.52%) location of haemorrhage were intracerebral,10 cases(23.80%) were subarachnoid bleeding and 7 cases(16.66%) were primarily intraventricular bleeding. (Figure-2b)

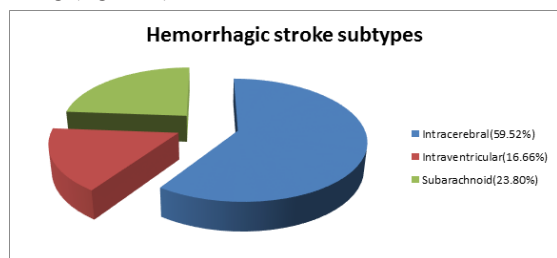


Figure 2b: Hemorrhagic Stroke Subtypes

In cases of intracerebral bleeding,there were predominantly MCA territory location hemorrhage(47.61%)cases followed by ACA territory(19.04%)and PCA territory(9.5%) haemorrhages.Among the ischemic type strokes,MCA territory lesions were found in 30 cases(38.46%),multinfarct state in 20 cases(25.64%) and ACA territory infarct & PCA territory infarct were 20.51%,15.38% respectively.

In this study 58 cases (48.33%) presented with pure motor hemiparesis or hemiplegia, 12cases (10%) presented with only lower limb weakness,22 cases(18.33%) presented with faciobrachial weakness while in 16 cases(13.33%) presenting complaints was vertigo & gait difficulties.(Table-2)

Table 2: Clinical Phenotypic Presentations

PRESENTATIONS	NO.	PERCENTAGE (%)
Pure motor hemiplegic	58	48.33
Isolated leg weakness	12	10
Pure sensory stroke	2	1.66
Dysarthria – clumsy hand	22	18.33
Vertigo & Gait disturbance	16	13.33
No focal neuro deficit	10	8.33
TOTAL	120	100

Overall cognitive impairment was found in 45 pts (37.5%), more commonly found in left sided cerebral lesions and more commonly in sub cortical lesions than cortical lesions. Most commonly affected cognitive domain was language in the form of defective naming of familiar objects, repetition, reading and obeying the written command, writing, coping objects. Language was affected in 50% of ACA stroke cases, 48% of MCA stroke cases, 43.75% of PCA stroke cases and 70% of multi infarct cases. In ACA territory stroke predominantly affected cognitive domain was in the area of attention & orientation part. In MCA lesions language was predominantly affected while memory was predominantly affected in PCA territory lesions. On the other hand memory was most commonly affected cognitive domain in multi infarct strokes (80%cases).[Figure-3]

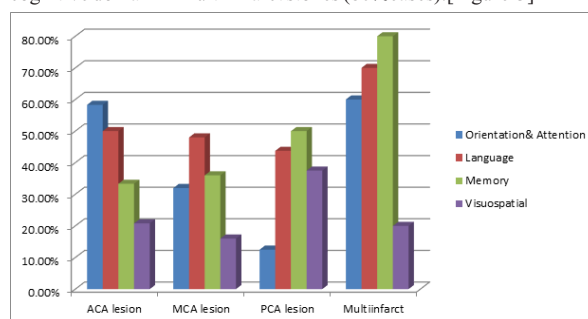


Figure 3: Affected Cognitive Domain In Various Territories Of Stroke

[ACA=anterior cerebral artery, MCA=middle cerebral artery, PCA=posterior cerebral artery]

DISCUSSION

Stroke is the main cause of adult disability and the second most leading cause of death worldwide.⁵We provide comprehensive information on demographics, risk factors, mechanisms, imaging characteristic of inpatient stroke pts in India. The predominant age group affected was above 65yrs (46.66%) and the percentage of men was 58.33%. The lower percentage of women may also reflect cultural bias, with men more likely to seek medical care. Study by Truelsen *et al.*, in 2001 showed that the average age of stroke in developing countries is 15 years earlier than the developed world.⁷The mean age of stroke in present study was 57.1 ± 1.7 years which is comparable to study done by Biswas *et al.*, in 2009 (Indians) 64 ± 10 years versus (Americans) 71 ± 13 years.⁸

Stroke at earlier age has been shown by various studies conducted in India.⁹ Approximately one fifth of the study population was below 55 yrs of age. Positive family history of stroke was present in 28cases (23.3%). Many previous studies showed that the risk of stroke doubles for each successive decade after age 55 years.¹⁰ HTN as a risk factor was present in 75% of our patients which was higher to 62% by Wu *et al.*, 2010.¹¹ Dyslipidemia was present in 70% of our patients that was higher than the earlier studies from India.¹² This can be attributed to westernization of diet pattern & sedentary life style. Diabetes was a risk factor in 60% of cases in present study which is higher to the studies done by Wu *et al.*, 2010 (32.2%), and by Lai *et al.*, 2008 (36.9%).¹³ More than half of the study population (60%) were habituated to sedentary life style. More than half of the study population (65%) were either overweight or obese as per ethnic BMI cut-off. Cigarette smoking is a potent risk factor for ischemic stroke.¹² Present study recorded 45.83% male patients with smoking which is lower than 53% reported by Wu *et al.*, 2010,¹¹ but higher than 31.3% reported by Lai *et al.*, 2008.¹⁴ Smoking increases stroke risk by producing acute effects on the risk of thrombus generation in narrowed arteries and chronic effects related to an increased burden of atherosclerosis.¹⁴ Our study showed that large vessel occlusive disease

was the most common cause of ischemic stroke (39.74%). The relative proportion of large artery disease in different western stroke registries varies from 14% to 66%.¹⁵ Variations in study designs, methods of patient selection and definition of stroke subtypes may partially account for the wide variations in the reported frequency of large artery disease. The incidences of other ischemic stroke subtypes in present study as per TOAST classification were as follows, small artery occlusion resulting lacunar strokes in 24 cases (30.76%), nonvalvular atrial fibrillation causing cardio embolic stroke in 9 cases (11.55%). Other determined etiology like hypercoagulable state, large artery vasculitis etc were responsible for 5.12% cases and etiology could not be arrived in 10 cases (12.82%) with the available investigational modalities. The presenting complaint of nearly half of our study population was either classical hemiplegia or hemiparesis. We observed overall cognitive impairment was found in 45 pts (37.5%), more commonly found in left sided cerebral lesions and more commonly in sub cortical lesions than cortical lesions. Majority of studies endorse the fact that the risk & severity of cognitive dysfunction do not seem to be influenced by the stroke type (ischemic or hemorrhagic). Researchers speculate that although the total volume of cerebral tissue damage is important yet volume of functional tissue loss may be more important. From the previous studies it is evident that left hemispheric lesion is more responsible for cognitive damage¹⁵, our study also support this fact. Poststroke dementia is more common in hemispheric stroke than brainstem or posterior fossa stroke. Stroke involving medial frontal cortex and left posterior cerebral artery involving ventromedial temporal lobe are also important.¹⁵ However many studies failed to document any relationship between stroke location and risk of post stroke dementia¹⁶. Most commonly affected cognitive domain in our study was language in the form of defective naming of familiar objects, repetition, reading and obeying the written command, writing, coping objects. Language was affected in 50% of ACA stroke cases, 48% of MCA stroke cases, 43.75% of PCA stroke cases and 70% of multiinfarct cases. In ACA territory stroke predominantly affected cognitive domain was in the area of attention & orientation part. In MCA lesions language was predominantly affected while memory was predominantly affected in PCA territory lesions. On the other hand memory was most commonly affected cognitive domain in multiinfarct strokes (80% cases). There are certain limitations our study was conducted in a tertiary care referral center for neurological diseases and therefore be biased toward the more disabling and complicated disease processes.

CONCLUSION

In this study, we have identified a high prevalence of risk factors of stroke among adults aged ≥ 40 years. Hypertension, dyslipidemia and lack of exercise were stronger contributors for overall stroke followed by family history of stroke, diabetes, and overweight and these factors are appropriate targets for the primary prevention of stroke. Individual-level and population-level interventions to control these leading risk factors of stroke identified in present study are needed to reduce the burden of stroke in the community. We also observed post stroke cognitive dysfunction was fairly common among stroke victims. So cognitive function assessment by appropriate validated battery of tests would be an integral part before discharging any stroke pt from hospital as it has got immense impact in the rest of their life.

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