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KEY WORDS: Stroke, hemorrhage.

A STUDY OF CLINICO-EPIDEMIOLOGICAL PROFILE OF PATIENTS WITH STROKE IN A TERTIARY CARE HOSPITAL OF SOUTHWEST RAJASTHAN

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ABSTRACT

OBJECTIVE: The objective of the work was to study the demographic characteristics, clinical features and neuro-imaging finding of stroke in a tertiary care hospital of southwest Rajasthan.

METHODS: A prospective observational study on stroke was carried out for a period of 2 year (October 2016 to September 2018). A total of 230 patients from Neurology department of Geetanjali medical college and hospital were enrolled in the study. The data were collected and evaluated by reviewing case files and patient interview using preformed proforma.

RESULT AND CONCLUSION: In our study, incidence of ischemic stroke was found to be higher. The occurrence of stroke steeply rises with age and was more common in male. The burden of stroke tends to be more in rural, illiterate, and low socioeconomic status population. The study reveals risk factors such as sedentary lifestyle, consumption of alcohol, tobacco smoking and underlying disease like hypertension, diabetes. Topographic distribution of cerebral infracts and hemorrhage was found to be more in supratentorial region, respectively. The study highlights the need for aggressive management of traditional risk factors, need for extensive work up in patients to find etiologies and need for more active intervention in community for the prevention of stroke.

INTRODUCTION

According to the World health Organization, stroke is defined as 'the rapid development of clinical signs and symptoms of a focal neurological deficit lasting more than 24 hours or leading to death with no apparent cause other than vascular origin'.[1] Stroke was found to be the second leading cause of death and was predominant at age above 60 years. According to WHO estimation, by 2050 nearly 80% of stroke cases may occur in low and middle-income countries like China and India.[2] Reliable mortality and morbidity estimate from India of stroke cases are limited due to uncertainty in identifying the causes of sudden death, multiple co-morbid diseases, and incomplete death certification. Ischemic and hemorrhagic stroke accounts for about 87% and 13%, respectively.[3] Ischemic stroke may be due to an obstruction within the blood vessel that supplies blood to the brain. Hemorrhagic stroke occurs due to the weakening of blood vessel which would rupture and bleed into the surrounding brain tissues and compress the surrounding tissue.[4-6] Risk factors include non-modifiable factors (age, gender, race, family and previous history, low birth weight), potentially modifiable factors (excessive alcohol, hypercoagulability, drugs, oral contraceptive use, acute infection), and modifiable factors (smoking or tobacco use, obesity, residential area, diet).[7-9] Our study was helpful in determining the frequency and percentage of risk factors, clinical manifestations, neuroimaging finding and severity assessment, in stroke patients admitted to a tertiary care hospital.

METHODS

A prospective observational study was conducted with the consent from Head of Department of Neurology at Geetanjali medical college and Hospital, Udaipur. The study was approved by Institutional Ethics Committee. The study was carried out for a period of 2 year (October 2016 to September 2018) enrolling 230 patients. The patient information was collected by reviewing case files and patient interview and filled in preformed proforma. Patients diagnosed with ischemic and haemorrhagic stroke on neuroimaging with or without comorbid disease, of both genders were included in the study. Patients who were uncooperative, refusal for consent, having TIA, Stroke mimics e.g. Todd's paresis, metabolic / toxic / infective encephalopathies and negative on neuro-imaging were excluded. The demographic data such as age, gender, risk factors (lifestyle, diet, resident areas, previous and family history, co-morbid disease), onset of stroke, clinical manifestations and neuroimaging finding were filled in performa. Mortality assessed by using Modified Rankin Score (mRS) after 28 day of onset of symptoms.

RESULTS

The study revealed that, the occurrence of stroke rises with age and was maximum in 61-70 years of age 30.86%. The male-to-female ratio was 1.7:1. Majority of the patients (137) was from rural community. Only 4.7% patients reached the hospital <4 hours of onset of symptoms, 53.04% patients had reached the hospital within 4-24 hours of onset of symptoms and 42.17% patients took more than 24 hours. While accounting for the co morbid risk factors hypertension was most common followed by Smoking, Diabetes, alcoholism, Ischemic heart disease and tobacco consumption. Most of the patients presented with motor symptoms such as weakness of one half of the body (76%), slurred speech (48%). Other 21.3% presents with complaints of impaired consciousness, 12.6% having vomiting, 11.3% having sensory disturbance and 10.8% patients presents with complaints of headache. In our study 184 (80%) patients were of ischemic and 46 (20%) patients had hemorrhagic stroke. In ischemic stroke patients following MRA findings we found that 26.6% had anterior cerebral artery, 58.7% had middle cerebral artery, 13.5% had posterior cerebral artery involvement. Here, 85.6% patients had stroke at supratentorial side and 14.4% patients had stroke at Infratentorial side. Among hypertensive hemorrhagic stroke patients thalamus was the most common site seen in 36.9% followed by basal ganglia 34.78%, cerebrum 15.21%, with 6.52% both in cerebellum and pons.

Table1.DistributionOfPatientsWithStrokeBasedOnAge

Age group	Stroke patient number	Percentage (%)
11-20 years	2	0.86
21-30 years	10	4.34
31-40 years	17	7.39
41-50 years	34	14.78
51-60 years	33	14.34
61-70 years	71	30.86
71-80 years	41	17.82
> 80 years	22	9.56

Mean Age ± SD	61.2 ± 15.59 years

Table 2. Distribution of patients with stroke based on time to reach hospital after onset of symptoms

Time of reporting to hospital	Number	Percentage (%)
< 4 hour	11	4.78
4-24 hour	122	53.04
>24 hour	97	42.17
Total	230	100

Table 3. Distribution of patients with stroke based on symptoms

Symptoms	Number	Percentage (%)
Motor disturbance	176	76.5
Speech disturbance	111	48.2
Impaired Consciousness	49	21.3
Vomiting	29	12.6
Sensory disturbance	26	11.3
Headache	25	10.8

Table 4. Distribution Of Patients With Stroke Based On Co-morbidRiskFactorInRelationToGender

Co-morbid risk factor	Male (146)		Female (84)		Total
	Number	Percentage (%)	Number	Percentage (%)	
HTN	109	74.6	64	76.1	173
Smoking	117	80.01	14	16.6	131
T2DM	41	28.08	26	30.95	67
Alcohol	47	32.19	2	2.3	49
IHD	28	19.1	9	10.7	37
Tobacco	27	18.49	4	4.7	31

Table 5. Distribution of patients with stroke based on type of lesions

Lesion	Number	Percentage (%)
Non hemorrhagic	184	80
Hemorrhagic	46	20

Table6. Distribution of patients with ischemic stroke based on MRAfinding

Artery	Number	Percentage (%)
Anterior Cerebral Artery	49	26.6
Middle Cerebral Artery	108	58.7
Posterior Cerebral Artery	25	13.5

Table7. Distribution of patients with stroke based on the site of lesion.

Site	Number	Percentage (%)
Supratentorial	197	85.6
Infratentorial	33	14.4

Table 8. Distribution of patients with hypertensive hemorrhagic stroke based on the site of lesion

Area	Number	Percentage (%)
Thalamus	17	36.95
Basal ganglia	16	34.78
Cerebrum	7	15.21
Cerebellum	3	6.52
Pons	3	6.52
Total	46	100

DISCUSSION:

The mean age in our study was 61.2±15.59 years which is comparable with two other studies done worldwide that show mean age of 63 years[10] and 63.66 years.[11] The most common age group involved in the present study was 61-70 years, which is closely comparable with other Indian studies.[10,12] The male-to-female ratio was 1.7:1 which is comparable to other epidemiological studies[13-16] where men had a higher incidence rate than women, ranging from 1.4:1 to 2:1. 93 patients come from urban and 137 from rural community, which is comparable with an Indian study that showed that the annual stroke incidence rate was slightly higher in the rural population than in the urban population.[17] In our study only a few patients (4.7%) reached hospital within 4 hours of onset of symptoms. Most of the patients (95%) took 24 hours or more to reach hospital which is comparable to an Indian study that showed that only 25% patients reach hospital before 4 hours of onset of stroke and 75% patients reach hospital after 4 hours.[18] Distance from the hospital, contact with a nearby doctor or quack, religious beliefs and low threat perceptions of symptoms were other independent causative factors for delay in arrival at hospital in rural patients.

SYMPTOMS OF STROKE:

In our study, the most common presenting complaints were motor disturbance (76.5%) and speech disturbance (48.2%). Other complaints include headache, vomiting, impaired consciousness and sensory disturbance. These observations are comparable to other worldwide studies[19,20] that showed hemiplegia/hemiparesis in 84%, dysarthria (speech disturbance) in 60% and motor dysphasia in 59% of the patients enrolled in their study.

CO-MORBID RISK FACTORS HYPERTENSION AND DM:

Here, the most common co-morbidity associated with stroke was hypertension (75.2%) followed by diabetes (29.1%), which is comparable to another Indian study[19] that showed that hypertension was the most common and diabetes was the next most common co-morbidity associated with stroke.[19] Ischemic heart disease was present in 16.08% cases that was higher than most other studies.[16,21]

In our study 17 % patients had dyslipidemia, and an Indian study, which reported 26% a figure that is comparable with studies done worldwide.[16,22] The role of dyslipidemia in the pathogenesis of cerebrovascular disease is less certain than for CAD; more consistent association has been noted with low high-density lipoprotein (HDL) cholesterol and high total cholesterol to HDL cholesterol ratio than with total cholesterol, low-density lipoprotein cholesterol and triglycerides.[23]

Smoking: Cigarette smoking is a potent risk factor for ischemic stroke.[24] In our study 56% of total sample size of patients were smokers. In the ischemic stroke subgroup 74% of the patients and in the hemorrhagic subgroup, 52% of the patients had previous history of smoking. The present study recorded 78% male patients with history of smoking which is higher than 53% reported by a worldwide study.[25]

Previous history of stroke was found in 4.3% of patients but it was not statistically significant when analyzed with gender distribution.

In our study, young patients(≤40 years) comprised of 12.6% of all stroke sufferers, that is comparable to other Indian studies.[22,23] The present study showed that hyperhomocysteinemia in 50% (9 out of 18) young patients of stroke. The findings are supported by another recent study, which showed that hyperhomocysteinemia was found in 48% of ischemic stroke patients.[26] While some researchers failed to determine any link between hyperhomocysteinemia and stroke.[27]

STOKE SUBTYPES:

In our study, 80% of sample size had ischemic stroke and 20% had hemorrhagic stroke which is comparable to another Indian study.[28] Also in our study 0.87% patients had venous stroke, as confirmed by magnetic resonance venography (MRV); while it was reported to be 8.9% in a previous study in 2013.[25] In our study, stroke was diagnosed mostly by MRI. Of those, 83.6% were ischemic strokes, 11.6% intracerebral hemorrhages, and 4.8% subarachnoid hemorrhages, respectively.[17]

- In our study, the middle cerebral artery (MCA) was the most affected artery in ischemic strokes. another previous study showed that infarction was highest in central parts of the MCA territory.[29]
- In our study the most common site of stroke in patients was the supratentorial, which could be correlated with other previous studies suggestive of similar site findings.[30-32]
- In our study the most common site of hypertensive hemorrhagic stroke was thalamus (36.95%), followed by basal ganglia (34.78%) and cerebral (15.21%); this data is again comparable with other Indian studies.[14,16,33]

In our study, a larger proportion (54.3%) of hemorrhagic stroke patients had left hemispheric brain lesion while 45.6% cases had right hemispheric lesions. Similarly in non-hemorrhagic stroke a large proportion (49.5%) had left hemispheric brain lesion while 44% cases had right hemispheric brain lesion, 8.69% cases had bilateral brain lesions. Other Indian studies observed similar results.[19,34]

OUTCOME OF STROKE:

In our study, 57% patient had moderate disability and 23% were bedridden, 28 days post stroke which was comparable to another Indian study.[17] The mortality rate in our study was 5.65% of the

sample size. In our data as per Modified Rankin Scale score, outcome of stroke was increased with age. In concordance with this, a number of studies provide strong evidence that younger age is associated with a better outcome after stroke rehabilitation. This is due increased physical health problems such as chronic diseases like HTN, DM, heart disease etc.[35] Another study shows that patients with worse mRS scores had a significant excess risk of death.[36]

CONCLUSION

In present prospective, cross-sectional study-

- Stroke was more common in males and is increases with increasing age. Rural population is affected more than urban population and patients from rural community take more time to reach hospital.
- Most common presenting complains was motor disturbances followed by speech disturbances, impaired consciousness, sensory disturbances, headache and vomiting.
- The following comorbidities were found to be associated with stroke. Hypertension (75.2%), Type 2 diabetes (29.1%), Ischemic Heart Disease (16.08%), past history of Stroke (4.3%), rheumatic mitral stenosis (1.73%) and rheumatic mitral regurgitation (0.86%).
- Hypertension and diabetes mellitus were more common in females while IHD, tobacco, smoking and alcohol consumption were more common in males.
- Hypertension, type 2 diabetes mellitus, IHD and smoking were more common in rural while tobacco and alcohol consumption were more common in urban patients.
- There were 29 patients whose age was less than 40 years, of whom 17 were males and 12 females.
- MRI brain and NCCT brain were the modalities used for diagnosis of stroke. 98.3% non-hemorrhagic and 54.3% haemorrhagic cases were diagnosed by MRI, and the rest by NCCT.
- Non-hemorrhagic (80%) stroke was more common than hemorrhagic (20%).
- In ischemic stroke, MRA (intracranial) revealed 58.7% MCA, 26.6% ACA and 13.5% PCA territory infarct.
- 54.3% hemorrhagic and 49.4% non-haemorrhagic stroke involved left hemisphere. 8.69% non-hemorrhagic stroke had bilateral lesions.
- Strokes were supratentorial in 85.6% patients and rest being infratentorial.
- The most common site of hypertensive hemorrhagic stroke was thalamus (36.95%) followed by basal ganglia (34.78%), cerebrum (15.21%), cerebellum (6.52%) and pons (6.52%).
- A majority of patients with Modified Rankin Scale (mRS) score <3 were in age group 41-50 years, score 3-4 in 61-70 years and score 5 in 71-80 years. Mortality, depicted by Modified Rankin Scale 6 score, was 5.65% of sample size.

REFERENCES

1. World Health Organisation. Preventing Chronic Diseases: A vital investment. Geneva, Switzerland. 2005.
2. Pandian JD, Sudhan P. Stroke epidemiology and stroke care services in India. J Stroke 2013;15(3):128-34.
3. Anthony S, Kasper L, Dan L, Braunwald E. Harrison's Principles of Internal Medicine.17th ed. United States of America, NY: McGrawHill; 2012.
4. Gary D, Stephen J. Pathophysiology of Disease an introduction to Clinical Medicine.7th ed. New York, NY: McGraw-Hill; 2014.
5. Glen C, Zhi L, Boryana S, Bradley P, Xinhua Z. Hemorrhagic transformation after ischemic stroke in animals and humans. J Cereb Blood Flow Metab 2014;34(2):185-99.
6. Subha PP, Pillai Geethakumari SM, Athira M, Nujum ZT. Pattern and risk factors of stroke in the young among stroke patients admitted in medical college hospital, Thiruvananthapuram. Ann Indian Acad Neurol 2015;18(1):20-3.
7. Jauch EC, Saver JL, Adams HP Jr, Bruno A, Connors JJ, Demaerschalk BM, et al. Guidelines for the early management of patients with acute ischemic stroke: A guideline for healthcare professionals from the American heart association/American stroke association. Stroke 2013;44(3):870-947.
8. Marinigh R, Lip GY, Fiotti N, Giansante C, Lane DA. Age as a risk factor for stroke in atrial fibrillation patients: Implications for thromboprophylaxis. J Am Coll Cardiol 2010;56(11):827-37.
9. Haast RA, Gustafson DR, Kiliaan AJ. Sex differences in stroke. J Cereb Blood Flow Metab 2012;32(12):2100-7.
10. Maskey A, Parajuli M, Kohli SC. A study of risk factors of stroke in patients admitted in manipal teaching hospital, Pokhara. Kathmandu Univ Med J (KUMJ) 2011 Oct-Dec;9(36):244-7.
11. Awad SM, Al-Jumaily HF, Al-Dulaimi KM, Abdulghafoor RH. Assessment of major risk factors among stroke patients. Saudi Med J 2010;31(9):1028-31.
12. Ukoha OB, Ajaegbu O, Eke CO. A review of stroke cases in a military hospital in Nigeria. AFRIMEDIC J 2012;3(2):30-3.
13. Vaidya C, Majmudar D. A retrospective study of clinical profile of stroke patients from GMERS Medical College and Hospital, Gandhinagar, Gujarat. International Journal of Clinical Trials 2014;62–6.
14. Aiyar I. A study of clinic-radiological correlation in cerebrovascular stroke (A study of 50 cases). Guj Med J 1999 Mar;52:58-63.
15. Pinhero L, Damodar S, Roy AK. Risk factors in stroke: a prospective study. J Assoc Physician India 2000 Jan;48:72-6.
16. Eapen RP, Parikh JH, Patel NT. A study of clinical profile and risk factors of cerebrovascular stroke. Guj Med J 2009;64(2):47-54.
17. Sridharan SE, Unnikrishnan JP, Sukumaran S, Sylaja PN, Nayak SD, Sharma PS, et al. Incidence, types, risk factors, and outcome of stroke in a developing country: The Trivandrum Stroke Registry. Stroke. 2009; 40: 1212-1218.
18. Ashraf VV, Maneesh M, Praveenkumar R, Saifudheen K, Girija AS. Factors delaying hospital arrival of patients with acute stroke. Ann Indian Acad Neurol 2015; 18(2): 162–166.
19. Baidya OP, Chaudhuri S, Gomti Devi K. Clinico-epidemiological study of acute ischemic stroke in a tertiary hospital of northeastern state of India. Int J Biomed Adv Res 2013;4(9):661.
20. Siddique AN, Nur Z, Mahbub S, Alam B, Miah T. Clinical presentation and epidemiology of stroke-a study of 100 cases. J Medicine 2009;10:86-9.
21. Kaur IR, Agarwal MP, Singh NR. Study of clinical profile & CT correlation in CV stroke. J Assoc Physician India 2001;51:112-7.
22. Adul-Rahman Sallam, Khalid Al-Aghbari. The clinical profile of stroke: a Yemeni experience. J Med J 2009;43(2):115-21.
23. Curb JD, Abbott RD, Rodriguez BL, Masaki KH, Chen R, Popper JS, et al. High density lipoprotein cholesterol and the risk of stroke in elderly men: The Honolulu heart program. Am J Epidemiol 2004;160:150-7.
24. Rodriguez BL, D'Agostino R, Abbott RD, Kagan A, Burchfi el CM, Yano K, et al. Risk of hospitalized stroke in men enrolled in the Honolulu Heart Program and the Framingham Study: A comparison of incidence and risk factor effects. Stroke 2002;33:230-6.
25. Wu CY, Wu HM, Lee JD, Weng HH. Stroke risk factors and subtypes in different age groups: A hospital-based study. Neurol India 2010;58:863-8.
26. Hassan A, Hunt B J, Michael O, D'souza RJSB, John, M, Hugh M. et.al. Homocysteine is a risk factor for cerebral small vessel disease, acting via endothelial dysfunction. Brain 2004;127(1):212-9.
27. Aps N, Verma I, Kaur S, Narang A, Gupta S, Avasthi G. Homocysteine - risk factor for ischaemic stroke. Indian J Physiol Pharmacol 2009;53(1):34-8.
28. Dalal PM, Malik S, Bhattacharjee M, Trivedi ND, Vairale J, Bhat P, et al. Population-based stroke survey in Mumbai, India: Incidence and 28-day case fatality. Neuroepidemiology 2008; 31:254-61.
29. Cheng B, Golsari A, Fiehler J, Rosenkranz M, Gerloff C, Thomalla G. Dynamics of Regional Distribution of Ischemic Lesions in Middle Cerebral Artery Trunk Occlusion Relates to Collateral Circulation. J Cerebr Blood Flow Metab 2011;31(1):36–40.
30. Rathi GR, Marathe VN, Gandage SG, Kachewar SG. MRI Evaluation of Ischemic Lesions of Brain. Int J of Healthca Biomed Res 2013;1(3):203-208.
31. Kertesz A, Black SE, NicholsonL, Carr T. The sensitivity and specificity of MRI in stroke- Neurology1987; 37; 1580-1585.
32. Samarasekera N, Fonville A, Lerpiniere C, Farrall AJ, Wardlaw JM, White PM, et al. Influence of Intracerebral Hemorrhage Location on Incidence, Characteristics, and Outcome: Population-Based Study. Stroke 2015;46(2):361–8.
33. Patne S, Chintale K. Study of clinical profile of stroke patients in rural tertiary health care centre. International Journal of Advances in Medicine. 2016;666–70.
34. Ito H, Kano O, Ikeda K. Differential variables between patients with left and right hemisphere ischemic stroke. J Stroke Cerebrovasc Dis 2008;17(1):35-8.
35. Konduru SST, Ranjan A, Bollisetty A, Yadla V. Assessment of risk factors influencing functional outcomes in cerebral stroke patients using modified rankin scale. World Journal of Pharmacy and Pharmaceutical Sciences. 2018;7(3):15.
36. Krista F Huybrechts, J. Caro, James J. Xenakis, Konstantinos N Vemmos. The Prognostic Value of the Modified Rankin Scale Score for Long-Term Survival after First-Ever Stroke. Cerebrovascular Diseases. 2008; 26(4):381-387.