Original Research Paper

Medicine

INCIDENCE OF VARIOUS APHASIA TYPES IN FIRST EVER ISCHEMIC STROKE (FEIS) PATIENTS AND ITS CLINICO-TOPOGRAPHICAL CORRELATION ON CT BRAIN

Dr. Krishna Pal Kohli	P.G Resident Medicine, JMC, Jhalawar, Rajasthan.
Dr. Akansha Jain	P.G Resident Medicine, JMC, Jhalawar, Rajasthan.
Dr. Rahul Kharkwal	PG Resident Radiodiagnosis, Dept. Radiodiagnosis, JLNHRC, Bhilai, Chhattisgarh.
Dr. Madhuri Meena*	Professor, Dept. of General Medicine, JMC, Jhalawar. *Corresponding Author

ABSTRACT Stroke is among the leading causes of disability worldwide and aphasia is one of the common manifestations of stroke. Specific brain areas have been assigned in the literature for various subtypes of aphasia. With the advancement in neuroradiology, it has been observed that lesions at a given cortical or subcortical site may manifest with different aphasia subtypes. **Objectives:** To assess various aphasia type and probable site of brain lesion by clinical examination and correlating clinical site of lesion with anatomical brain lesion using CT. **Method:** A prospective cross-sectional study in patients of ≥18 years of age with first ever acute ischemic (FEIS) stroke and aphasia were subjected to clinical examination for stroke and aphasia using WAB-Modified and NIHS Score. Statistical analysis was done with χ2 test (p value < 0.05). **Results:** Out of 68 patients, Global aphasia was the most common aphasia subtype (38.23%) and significant correlation was observed in patients with NIHS score ≥15(Severe Stroke) and AQ >15(Severe Aphasia). Global, Wernicke`s, Broca`s, and Anomic aphasics showed significant correlation between aphasia type and specific lesion on CT scan. **Conclusion:** A significant correlation exist between the clinical aphasia type and specific brain lesion in CT scan.

INTRODUCTION

Stroke is a major health problem in India. The crude prevalence of stroke ranges from 44.29 to 559/100,000 persons in different parts of the country during the past decade.[1] WHO defined stroke as a syndrome of rapidly developing clinical signs of focal or global disturbance of cerebral function, with symptoms lasting for 24 hours or longer with no apparent cause other than of vascular origin. Stroke is among the leading causes of the disability worldwide and aphasia is one of the common manifestations of stroke that occurs with a frequency, that ranges from patients ranges from 21 to 38% in stroke patients.[2] **Aphasia,** is loss and impairment of language caused by brain damage. In humans, speech is the core to every way of expressing thoughts and emotions to others. Loss or impairment of this ability causes various negative effects, which may affect patient physically, as well as mentally, and may cause post-aphasia depression.[3] Presence of aphasia is an index of poor prognosis, with more severe motor, cognitive, and social disability[4]. Mixed thoughts regarding, lesion site being the major deciding factor for the type of aphasia has come up over time. Involvement of the cortical language area being the major determinant in aphasia subtype was favoured by (Hayward et al., Kreisler et al., Yang et al.)[5,6,7], whereas opposed by some. Over time, with advancement in neuroradiology, subcortical brain areas have also came into picture as a cause of aphasia. However, any strict correlation between subcortical lesion and specific aphasia type is yet to be established.[8]

AIMS AND OBJECTIVES:

To assess the characteristic pattern of aphasia and probable site of lesion by clinical examination and correlating it with specific brain lesion on CT imaging.

MATERIAL AND METHODS:

Patients with First ever ischemic stroke (FEIS), with age≥18 years, reporting to the SRG Hospital Jhalawar, Rajasthan, within 7 days of stroke onset, during the study period were selected as per WHO definition of stroke (using simple random sampling technique). Patients with haemorrhagic stroke, previous history of disturbed speech/hearing, mental obtundation, dementia, recent head injury, recurrent stroke, and metabolic disorders were excluded. Stroke severity and language assessment was done using National Institute of Health Stroke Scale (NIHSS) and Western Aphasia Battery (WAB)[9]-Modified. Patients were then classified into fluent (Wernicke's, transcortical sensory, conduction and anomic aphasia) and non-fluent (Broca's, global, transcortical motor, transcortical mixed) aphasia based on their scores of WAB. All the patients of stroke were subjected to neuroimaging (CECT Brain- Phillips Ingenuity 128 slice) for localization of the lesion. Data was recorded in excel sheet and evaluated using Chi-square test on SPSS 27.0.1.0 (Trial version), (p value < 0.05).

RESULTS:

A total of 68 post FEIS aphasia patients were included in the study, mean age of the population was 69.07±6.5 years and majority were between 66-70years age group (48.52%).

There were 45.59% Males and 54.41% Females. Patients with severe stroke (NIHSS >15) contributed to more than two third of the total study population (72.06%). Global aphasia was the most common aphasia subtype (38.23%), followed by Broca's (19.12%), Wernicke's (17.65%), Anomic (17.64%), Transcortical sensory (4.41%) and Transcortical motor (2.94%) (Fig. 1)
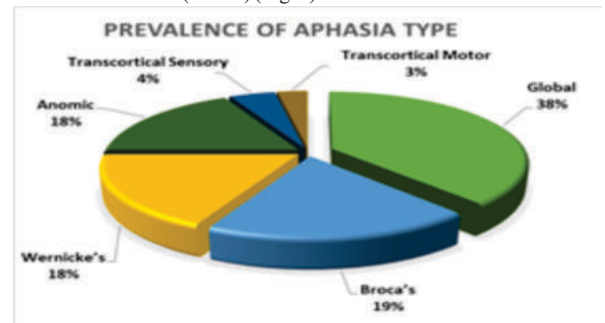

Fig.1: Prevalence Of Various Aphasia Subtypes.

Severity of aphasia (as per Aphasia Quotient), showed significant correlation between the higher stroke severity (NIHSS ≥15) and poor aphasia score (AQ<50) (p value=0.02). There was significant correlation (p<0.05) in patients with Global aphasia, Broca's aphasia, Wernicke's aphasia and anomic aphasia, between clinical aphasia type and probable leison with CT finding suggestive of involvement of corresponding language area. (Table.2). Whereas the correlation was poor in patients with Transcortical Sensory & motor aphasia. Some patients had lesion in sites other than classic language area (like subcortical area, basal ganglia etc.) which need further evaluation.

Table 2: Aphasia- CECT Brain Correlation.

	CECT Lesion (involving Language area)	P value (Chi Square) (<0.05)
Global	Left Fronto-Parieto-Temporal	0.0000003
Broca's	Left Frontal lobe	0.0017
Wernicke's	Left Temporal lobe	0.0000015
Anomic	Lt Parieto-Temporal	0.0073
Transcortical sensory	Lt Temporal Lobe	0.16
Transcortical motor	Lt Frontal Lobe	0.27

DISCUSSION:

In our study, mean age of the study population was 69.07 ± 6.5 years, with majority of patients being in the age group of 66-70year (n= 33, 48.52%). Similar findings were observed in other studies.[10,11,12] Ratio of Male: Female was 1: 1.19, similar to the study of Engleter et al.[10] and H.L flowers et al.[12] Out of 68 patients of FEIS, 49 patients (72.06%) had severe stroke, assessed by NIHS Scoring (Score ≥ 15). Non-fluent aphasia was more common than fluent aphasia (63.23% vs 36.76%). Mean age for fluent and non-fluent aphasia was 65.80 years and 71.09 years, respectively. Ferro and Madureira[13] in their study found patients with non-fluent aphasia to be younger than those with fluent aphasia. However, the patients in those studies were not assessed in the acute stage, also they missed older patients. Global aphasia was the most prevalent aphasia type (38.23%), followed by Broca's (19.12%), Wernicke's (17.65%), anomic (17.64%), transcortical sensory (4.41%) and transcortical motor with frequency of 2.94%. This observation was in line with previous studies regarding the type of aphasia prevalence in post-stroke patients. Out of 68 patients, 70.59% patients (n=48) had severe aphasia and a significant correlation was found in between Severe Stroke (NIHS score ≥ 15) and Severe Aphasia (AQ >15). (P=0.02) Similar observations were made by Laska et al.[14] & Pedersen et al.[15], where they found that the outcome for language function was better predicted by initial stroke severity and severity of the aphasia but not by age, sex or type of aphasia. After clinical assessment and subjecting patients to neuroimaging, when the various site of lesion was brought together, a significant correlation was observed between the various well-established language areas of the brain clinically and through neuroimaging. (p<0.05) Croquelois, A. and Bogousslavsky, J.[16] in a study on aphasia patients, mentioned that stroke location and associated manifestations strongly influence aphasia subtypes. They also found that 26.4% patients were exception to the thought of classic clinico-topographic correlation, rest were localized to the respective sites.

CONCLUSION:

A significant correlation exist between the aphasia type assessed clinically and involved brain lesion in CT scan.

Source of Support: Nil

Conflicts Of Interest: None.

REFERENCES

1. Sureshkumar Kamalakannan et al. Incidence and prevalence of stroke in India: A systematic review. Indian J Med Res. 2017 Aug; 146(2): 175-185
2. Pedersen PM, Jørgensen HS, Nakayama H, Raaschou HO, Olsen TS. Aphasia in acute stroke: incidence, determinants, and recovery. Ann Neurol. 1995 Oct;38(4):659-66. doi: 10.1002/ana.410380416.PMID: 7574464.
3. Thomas SA, Lincol n NB. Predictors of emotional distress after stroke. Stroke 2008;39:1240-5.
4. Wade DT, Hewer RL, David RM, Enderby PM. Aphasia after stroke: natural history and associated deficits. J Neurol Neurosurg Psychiatry. 1986;49:11–16.
5. Naeser MA, Hayward RW. Lesion localization in aphasia with cranial computed tomography and the Boston Diagnostic Aphasia Exam. Neurology. 1978 Jun;28(6):545-51. doi: 10.1212/wnl.28.6.545. PMID: 565884.
6. Godefroy O, Dubois C, Debachy B, Leclerc M, Kreisler A; Lille Stroke Program. Vascular aphasias: main characteristics of patients hospitalized in acute stroke units. Stroke. 2002 Mar;33(3):702-5. doi: 10.1161/hs0302. 103653. PMID: 11872891.
7. Zhong-Hua Yang, Xing-Quan Zhao, Chun-Xue Wang, Hong-Yan Chen & Yu-Mei Zhang (2008) Neuroanatomic correlation of the post-stroke aphasias studied with imaging, Neurological Research, 30:4, 356-360, DOI: 10.1179/174313208X300332
8. Mega, M.S., Alexander, M.P., 1994. Subcortical aphasia: the core profile of capsulostriatal infarction. Neurology 44, 1824–1829.Mesulam, M.M., 2001. Primary progressive aphasia. Ann. Neurol. 49, 425–432.
9. Kertesz A, Poole E., 1974. The aphasia quotient. The taxonomic approach to measurement of aphasic disability. Canadian Journal of Neurological Sciences, 1, 7- 16
10. Engelter, S. T., Gostynski, M., Papa, S., Frei, M., Born, C., Ajdacic Gross, V., Gutzwiller, F. & Lyrer, P. A. (2006) Epidemiology of aphasia attributable to first ischemic stroke: incidence, severity, fluency, etiology, and thrombolysis. Stroke, 37 (6), 1379–1384.
11. Bohra, V., Khwaja, G.A., Jain, S., Duggal, A. Ghuge, V.,Srivastava, A. (2015) Clinicoanatomical correlation in stroke related aphasia. Annals of Indian Academy of Neurology, 18, 424–429. doi:10.4103/0972-2327.165469
12. Flowers HL, Silver FL, Fang J, Rochon E, Martino R. The incidence, co-occurrence, and predictors of dysphagia, dysarthria, and aphasia after first-ever acute ischemic stroke. J Commun Disord. 2013 May-Jun;46(3):238-48. doi: 10.1016/j. jcomdis.2013.04.001. Epub 2013 Apr 12. PMID: 23642855.
13. Ferro JM, Mariano G, Madureira S. Recovery from aphasia and neglect. Cerebrovasc Dis. 1999;9 Suppl 5:6-22. doi: 10.1159/000047571. PMID: 10473916.
14. Laska, A. C., Hellblom, A., Murray, V., Kahan, T. & Von Arbin, M.(2001) Aphasia in acute stroke and relation to outcome. Journal of Internal Medicine, 249 (5), 413–422
15. Pedersen PM, Vinter K, Olsen TS. Aphasia after stroke: type, severity and prognosis. The Copenhagen aphasia study. Cerebrovascular Dis 2004; 17(1): 35–43
16. Croquelois, A. and Bogousslavsky, J., 2011. Stroke aphasia: 1,500 consecutive cases. Cerebrovascular diseases, 31(4), pp.392-399.