

## VERBAL CHOICE IN ISCHEMIC STROKE PATIENTS WITH ANOMIC APHASIA

Maya P. Danovska, Dora Peichinska, Mirena P. Valkova, Boyko Stamenov.  
Neurology Clinic, University Hospital, Medical University - Pleven, Bulgaria

### ABSTRACT

**Background and purposes:** Anomic aphasia is common in patients with left hemispheric strokes. The purpose of this study was to explore the verbal production of ischemic stroke patients with anomic aphasia.

**Contingent and methods:** Fifty ischemic stroke patients admitted to the Neurology Clinic of University Hospital Pleven were studied by neuropsychological battery and CT scan of the brain. Verbal productivity changes found were analyzed in relation to the speech recovery education.

**Results:** All the patients showed lower scores at all nominative and reproductive speech subtests.

**Discussion:** Among the ischemic stroke patients with mild anomic aphasia comparatively great was the percentage of low frequency word actualization and verbal fluency impairment. The usage of nominatives in speech expression of ischemic stroke patients is less as compared with that one of predicatives. Actualization of particles, unions, prepositions and interjections was comparatively high thus compensating the difficulty in choice of a definite lexical number.

**Conclusion:** Future studies on testing of verbal choice in ischemic stroke patients should confirm its practical significance for the assessment of speech disorders concerning a special speech- recovery education.

**Key words:** Verbal choice, ischemic stroke, anomic aphasia

### INTRODUCTION

Aphasia is developed in over one third of cases with acute stroke in the left hemisphere [1]. A distinctive feature of aphasia is anomic aphasia, being one of most frequent

clinical signs [2, 3]. Two types of anomic aphasia have been described: phonological and semantic anomia [3].

Verbal productivity of patients with aphasia is extremely important for the correct diagnosis and adequate speech-recovery education [4, 5, 6, 7].

Testing of verbal choice is considered a reliable and objective method for assessment of speech disorders. For that reason verbal choice assessment is still an area of growing scientific investigations and analyses [8].

The purpose of the present study was to examine and to analyze the verbal choice of patients with ischemic stroke and aphasic disorders of anomic type.

### CONTINGENT AND METHODS

We studied 50 patients with anomic disorders (32 males and 18 females, 34 to 80 years old), who were admitted to the Neurology Clinic, University Hospital, Pleven. CT scan of the brain was performed to confirm the diagnosis ischemic stroke. Neuropsychological tests of A. R. Luria [8] were used for the evaluation of nominative and reproductive speech of patients with aphasic disorders (modified in Bulgarian language by P.Ovcharova et al) [9]:

- Neuropsychological battery for evaluation of nominative speech function
  - naming of 6 objects, located in the visual field;
  - naming of 6 objects, based on their description;
  - verbal fluency: naming of 5 fruits for 5 seconds.
- Examination of reproductive speech - oral paraphrase of a definite text after it has been read once by the examiner.

### RESULTS:

The results from nominative speech evaluation are given in **Table 1**.

**Table 1.** Results from nominative speech evaluation.

Subtests	Successful performance	Usage of paraphasias	Usage of diminutive words	Usage of low frequency words	Unsuccessful performance
Naming of objects, in the visual field	31(62.0%)	14 (28.0%)	-	-	5 (10%)
Naming of objects by description	17 (34.0%)	14 (28.0%)	6 (12.0%)	-	13 (26.0%)
Verbal fluency	10 (20.0%)	2 (4%)	7 (14%)	17 (34.0%)	24 (48%)

Of all the studied patients only 31 (62.0%) managed to perform correctly tasks of the first subtest, due to the fact that they had the visual support of the object, that facilitated word actualization. Fourteen patients (28%) also managed successfully but with verbal paraphasias. Less was the number of correct answers in the second subtest characterized with naming of objects based on their description, because of lack of visual support - only 17 (34.0%). Greatest difficulties had patients with the subtest used for assessment of verbal fluidity. Only 10 (20.0%)

managed to execute correctly the task. It was found that 17 (34.0%) used low frequency words with coexisting difficulties in high frequency words actualization. Only 7 (14.0%) patients used diminutive nouns and usually they had difficulties in articulation.

The results from quantitative analysis of reproductive speech-usage of nominatives, predicatives, particles, unions, prepositions and interjections, are given in **Table 2**.

**Table 2** Results from the quantitative analysis of verbal choice in reproductive speech v/s the text given.

N=50	Nominatives	Predicatives	Particles, unions, prepositions, interjections
Verbal choice	6.4 (49.2%)	9.8 (75.4%)	8.6(75.4%)
Given text	13 (100%)	13 (100%)	11 (100%)

The greatest was the number of predicatives actualization (75.4%) as compared to the given text, followed by the usage of particles, unions, prepositions and interjections (66.1%) and the least was that of nominatives (49.2%).

#### DISCUSSION

The present study demonstrates the clinical significance of verbal choice testing in anomic aphasias after left hemispheric ischemic stroke.

Verbal fluency as a cognitive function that facilitates informational retrieval from memory requires normal executive control and intact working memory [10]. It is proven that many brain areas (predominantly frontal and temporal lobes) are associated with verbal fluency [10]. Hillis and al. [11] have discussed brain regions involved with object naming, and reported the importance of left temporal cortex. Our study reveals greater difficulties in verbal fluency v/s naming of objects in the visual field and by description, which has been also found by Tatemichi and al [12] and Planton and al [13]. Such a finding could be explained by the wider representation of verbal fluency areas in brain cortex compared to the object naming ones. Unlike Alzheimer dementia patients [14], left hemispheric stroke survivors show common usage of low frequency words on verbal fluency tests [9, 4]. Loss of semantic word relations after temporal lesion in stroke survivors [8] v/s predominantly memory impairment in classic Alzheimer dementia is the most reasonable explanation. However, that is not clarified, yet, but up to our knowledge this phenomenon could be useful in everyday practice for the differential diagnosis between post-stroke aphasia and degenerative dementia. We also found more difficulties in object naming by description, compared to naming with visual support, data in accordance with the hypothesis of

Coccia and al [15]. However, on the basis of our results, we may conclude that verbal fluency examination in cases of anomic aphasia is the most sensitive test. Even in more severe clinical cases with impairment of object naming and paraphasias, patients could show intact naming with visual support, but impaired description of object naming.

Our study results reveal that the greatest is the number of predicatives actualization as compared to the given text, followed by the usage of particles, unions, prepositions and interjections and the least is that of nominatives. Such a finding could be explained by the existing disorganization of word semantic fields typical for anomic disorders. Actualization of particles, unions, prepositions and interjections is comparatively high thus compensating the difficulty in choice of a definite lexical number.

On the basis of our results we can promote verbal choice as good test for anomic aphasia screening in patients after stroke, although future studies should confirm its practical significance for the assessment of speech disorders concerning a specific speech- recovery education.

#### CONCLUSIONS:

Among the ischemic stroke patients with mild anomic aphasia comparatively great is the percentage of low frequency word actualization and verbal fluency impairment. The usage of nominatives in speech expression of ischemic stroke patients is less as compared with that of predicatives. Actualization of particles, unions, prepositions and interjections is comparatively high thus compensating the difficulty in choice of a definite lexical number. However, future studies on testing of verbal choice in ischemic stroke patients should confirm its practical significance for the assessment of speech disorders in association with a specific speech- recovery education.

## REFERENCES:

1. Pulvermüller F, Neininger B, Elbert T, Mohr B, Rockstroh B, Koebbel P, et al. Constant-induced therapy of chronic aphasia after stroke. *Stroke* 2001 Jul;32(7):1621-6. [[PubMed](#)]
2. Bersano A, Burgio F, Gattinoni M, Candelise L; PROSIT Study Group. Aphasia burden to hospitalised acute stroke patients: need for an early rehabilitation programme. *Int J Stroke*. 2009 Dec;4(6):443-7. [[PubMed](#)] [[CrossRef](#)].
3. Salles JF, Holderbaum CS, Parente MA, Mansur LL, Ansaldo AI. Lexical-semantic processing in the semantic priming paradigm in aphasic patients. *Arq Neuropsiquiatr*. 2012 Sep;70(9):718-26. [[PubMed](#)] [[CrossRef](#)]
4. Tsvetkova LS. Some ways of optimization of aphasics rehabilitation. *Int J Rehabil Res*. 1980; 3(2):183-90. [[PubMed](#)]
5. Kulik TB, Wronska I, Koc-Kozłowiec B. Speech re-education in patient with motor aphasia in collaboration with family. *Ann Univ Mariae Curie Skłodowska Med*. 2001; 56: 369-74. [[PubMed](#)]
6. Lazar RM, Minzer B, Antonello D, Festa JR, Krakauer JW, Marshall RS. Improvement in aphasia scores after stroke is well predicted by initial severity. *Stroke*. 2010 Jul;41(7):1485-1488. [[PubMed](#)] [[CrossRef](#)]
7. Darrigrand B, Dutheil S, Michelet V, Rereau S, Rousseaux M, Mazaux JM. Communication impairment and activity limitation in stroke patients with severe aphasia. *Disabil Rehabil*. 2011;33(13-14):1169-78. [[PubMed](#)] [[CrossRef](#)]
8. Luria A. The functional organization of the brain. *Sci Am*. 1970 Mar; 222(3):66-72 passim. [[PubMed](#)]
9. Ovcharova P, Raichev R. Aphasia, apraxia, agnosia. *Medicina i fizkultura Sofia*, 1980. [in Bulgarian]
10. Baldo JV, Schwartz S, Wilkins D, Dronkers NF. Role of frontal versus temporal cortex in verbal fluency as revealed by voxel-based lesion symptom mapping. *J Int Neuropsychol Soc*. 2006 Nov;12(6):896-900. [[PubMed](#)] [[CrossRef](#)]
11. Hillis AE, Tuffiash E, Wityk RJ, Barker PB. Regions of neural dysfunction associated with impaired naming of actions and objects in acute stroke. *Cognit Neuropsychol*. 2002 Sep 1; 19(6):523-534. [[PubMed](#)] [[CrossRef](#)]
12. Tatemichi TK, Desmond DW, Stem Y, Paik M, Sano M, Bagiella E. Cognitive impairment after stroke: frequency, patterns, and relationship to functional abilities. *J Neurol Neurosurg Psychiatry*. 1994 Feb;57(2):202-207. [[PubMed](#)]
13. Planton M, Peiffer S, Albucher JF, Barbeau EJ, Tardy J, Pastor J, et al. Neuropsychological outcome after a first symptomatic ischemic stroke with good recovery. *Eur J Neurol*. 2012 Feb;19(2):212-219. [[PubMed](#)] [[CrossRef](#)]
14. Gomez RG, White DA. Using verbal fluency to detect very mild dementia of the Alzheimer type. *Arch Clin Neuropsychol*. 2006 Dec;21(8): 771-5. [[PubMed](#)] [[CrossRef](#)]
15. Coccia M, Bartolini M, Luzzi S, Provinciali L, Matthew A, Ralph L. Semantic memory is an amodal, dynamic system: Evidence from interaction of naming and object use in semantic dementia. *Cognit Neuropsychol*, 2004 Jul 1;21(5):513-527. [[PubMed](#)] [[CrossRef](#)]

### Address for correspondence:

Maya Danovska

Department of Neurology, University Hospital, *Medical University - Pleven*.

8A, Georgi Kochev str., 5800 Pleven, Bulgaria

Tel: +359 64 886 276; Fax: +359 64 801 524

E-mail: [mdanovska@yahoo.com](mailto:mdanovska@yahoo.com)