

APHASIA IN PATIENTS WITH ISCHEMIC STROKE

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SUMMARY – Aphasia in ischemic stroke patients is associated with increased mortality, decreased rates of functional recovery, and reduced work capability. The aim was to study the prevalence and characteristics of aphasia in ischemic stroke patients. This prospective, cohort study included 177 patients (94 male and 83 female) hospitalized for ischemic stroke at University Department of Neurology in Osijek in 2010. All patients were examined by a neurologist and speech therapist to specify the subtype of stroke and speech disturbance. The study showed 75 (42.4%) study patients to have aphasia (48.2% of females and 37.2% of males). The most frequent clinical type was expressive-receptive aphasia. Aphasic patients were statistically significantly older (75 *vs.* 70 years) and showed female predominance (53% *vs.* 42%). Patients with aphasia also had a threefold share of large vessel stroke (51% *vs.* 17%) and approximately twofold share of cardioembolic stroke (41% *vs.* 22%). The share of left hemisphere stroke was nearly twofold in aphasic (61%) compared to non-aphasic (31%) patients. The study showed a high prevalence of aphasia in patients with ischemic stroke, which increased with age, was more pronounced in females and most frequently found in patients suffering from large vessel stroke and cardioembolic stroke.

Key words: *Ischemic stroke; Aphasia; Functional recovery; Epidemiology*

Introduction

In human population, speech is the main way of expressing thoughts and emotions and of interacting with others. That is why the loss or impairment of this ability causes diverse negative effects¹, hence, it is understandable that aphasia is considered a risk factor for post-stroke depression^{2,3}. Beside this, it is a risk factor for recurrence of stroke⁴, and is connected with higher short- and long-term morbidity, mortality and expenditure⁵, residual post-stroke disability⁶ and dependence⁷, and also a predictor of longer hospital stays⁸. Furthermore, recovery from aphasia is often incomplete and patients are mostly unable to return to previous working place and their common social

activities⁹, all of which decrease the quality of life. The prevalence of aphasia varies from 15% to 40%, which makes a large number of patients in any population. According to some investigators, aphasia is one of the most important factors for misdiagnosis of acute stroke and applying inappropriate therapy^{10,11}. Researchers also emphasize the fact that early treatment of aphasia is important because it greatly affects the overall rehabilitation of patients with stroke¹². With all these facts considered, the aim of this study was to investigate the prevalence and clinical characteristics of aphasia in our population and to confirm or deny some results from previous studies, which are still questioned.

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Received September 21, 2011, accepted April 20, 2012

Patients and Methods

The study included 177 patients with first ischemic stroke treated at University Department of Neurolo-

Table 1. Clinical characteristics and stroke subtypes among aphasic and non-aphasic patients. *Other = both hemispheres, basal ganglia, brain stem, cerebellum (statistics: ^ΔStudent's *t*-test; [#]Pearson's χ^2 -test; ⁺Fisher exact test)

Clinical characteristic	First ischemic stroke patients (N=177)		p value
	Aphasic (n=75; 100%)	Non-aphasic (n=102; 100%)	
Age, mean (range) (yrs)	75 (44-92)	70 (50-96)	$p=0.001^{\Delta}$
Gender, female % (n)	53 (40)	42 (43)	$p=0.141^{\#}$
Damaged hemisphere % (n)			
Right hemisphere	33 (25)	47 (48)	$p<0.001^+$
Left hemisphere	61 (45)	31 (32)	
Other*	6 (5)	22 (22)	
Subtype of stroke % (n)			
Small vessel stroke	0 (0)	46 (47)	$p<0.001^+$
Large vessel stroke	51 (38)	17 (17)	
Cardioembolic stroke	41 (31)	22 (23)	
Other determined stroke	4 (3)	3 (3)	
Undetermined stroke	4 (3)	12 (12)	

gy, Osijek University Hospital Center, during the year 2010. In all patients, the diagnosis was established by clinical examination, confirmed by computed tomography, and if needed, with other diagnostic procedures. The subtypes of ischemic stroke were determined by use of the Trial of Org 10172 in Acute Stroke Treatment (TOAST) classification, which comprises large vessel stroke (LVS), small vessel stroke (SVS), cardioembolic stroke (CES), stroke of other cause or etiology (OUS), and undetermined stroke (US)¹³. Speech ability was evaluated by a speech therapist using Boston test^{14,15}, according to which patients were divided into two groups, aphasic (aphasia and dysphasia included) and non-aphasic, and were compared according to age, gender, damaged hemisphere and stroke

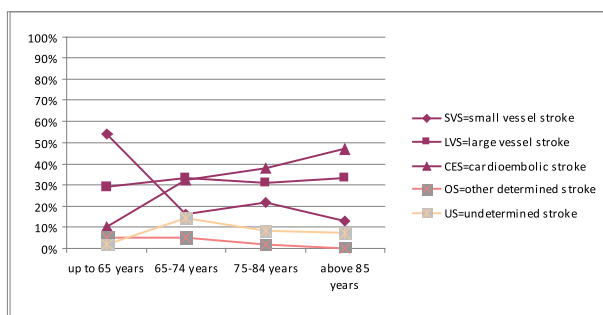


Fig. 1. Share of different ischemic stroke subtypes according to age.

subtype. Beside this, the share of three aphasia subtypes (expressive, receptive and expressive-receptive) was analyzed.

Statistical analysis was performed using SPSS 13.0 for Windows. The tests used are indicated in Table 1. Values of $p<0.01$ were considered significant.

Results

Considering stroke subtypes, the share of SVS declined and the share of LVS and CES increased with

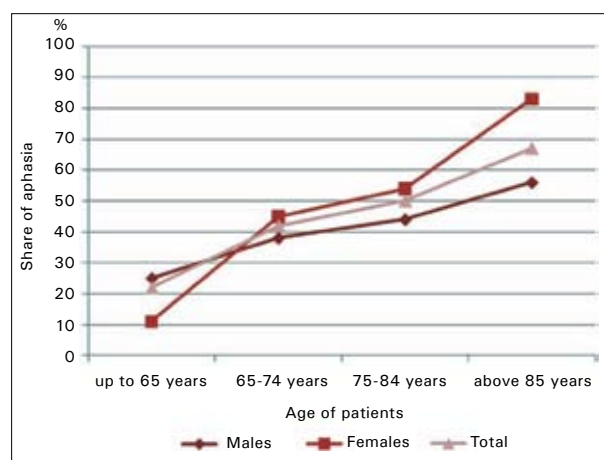


Fig. 2. Gender and age effect on the prevalence of aphasia attributable to ischemic stroke.

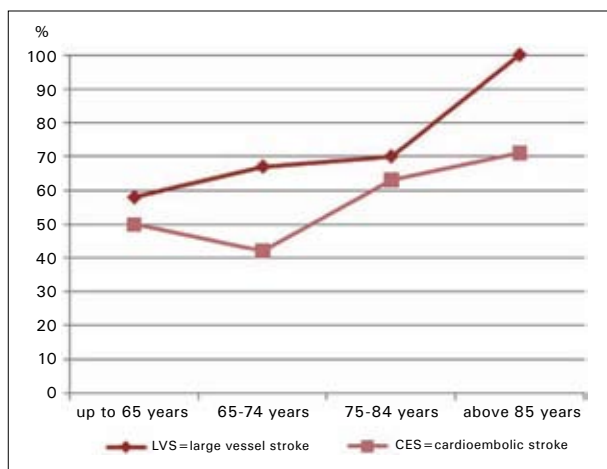


Fig. 3. Share of aphasia according to age in large vessel stroke and cardioembolic stroke.

age (Fig. 1). Of 177 study patients, 75 (42.4%) had aphasia (48.2% of females and 37.2% of males). The most frequent clinical type of aphasia was expressive-receptive aphasia (68%), followed by expressive aphasia (29%) and receptive aphasia (3%). Aphasic patients were older (75 *vs.* 70 years, $p=0.001$) and showed female predominance (53% *vs.* 42%). Aphasic patients had a threefold share of LVS (51% *vs.* 17%) and approximately twofold share of CES (41% *vs.* 22%). Left hemisphere stroke prevailed in aphasic patients (61% *vs.* 33%) (Table 1). The study showed the prevalence of aphasia to rise with age, which was more pronounced in females (Fig. 2). Also, the share of aphasia in LVS and CES increased with age (Fig. 3).

Discussion

This prospective, cohort study of the epidemiology of aphasia in stroke patients showed a large proportion of patients with first ischemic stroke to suffer from aphasia. The prevalence of aphasia in patients with first ischemic stroke in our population (42%) was rather high when compared with other countries (15%–40%)^{1,5-8,16-18}. Also, this proportion greatly varies among different countries, which makes comparisons and conclusions questionable, since it is not likely that such differences could be just a matter of population attributes, but also of the criteria and classification of speech disturbances used.

The probability of suffering from aphasia after ischemic stroke rises with age. In the group of pa-

tients up to 65 years, the prevalence of aphasia was 25% in males and 11% in females, and in the group of patients above 85 years, the prevalence of aphasia increased twofold in males and 7.5 times in females. This result is in line with the results of some other studies^{8,18-20}, which showed a significant increase in the rate of aphasia with age. In order to find some reasons for this finding, the subtypes of ischemic stroke according to age were analyzed. Although the occurrence of LVS and CES as the most frequent subtypes in aphasic patients increases with age, this increase is not prominent enough to be a reason *per se*. Thus, further analysis and explanations are needed.

In one half of aphasic patients, the cause of stroke was large vessel disease, and in another 41% it was cardioembolism. Some other investigators report on cardioembolism as the main cause of aphasia¹⁸, but this study did not confirm those findings. Yet, it is interesting that the rate of aphasia increased with age in LVS and CES stroke subtypes and we did not find any explanation for this phenomenon in the literature.

Another intriguing finding was the rather high occurrence of aphasia in patients with right hemisphere strokes. In some studies and also in classical literature this proportion is lower¹⁰. We found no specific explanation for such a high rate of aphasia in primary right hemispheric lesions. However, researchers have shown that the right hemisphere plays an important compensatory role in language function after left hemispheric lesions. It is also known that both hemispheres have a role in language function, so it is possible that right hemisphere strokes play a more important role in the occurrence of aphasia than it is currently understood. Furthermore, extensive edema surrounding some right hemisphere lesions could influence the function of the left hemisphere by creating pressure in this particular area. Unfortunately, no data on the dominant hemisphere were collected, and this information would be useful in the interpretation of our unusual finding. It is possible that differences in the classification used (aphasia and dysphasia in Croatian literature *vs.* aphasia in Anglo-Saxon literature) added to this discrepancy. Studies including large patient samples could further elucidate this finding and offer a more accurate insight.

As expected, the most usual type of aphasia was expressive-receptive (global) aphasia, as in other cohorts investigated²¹.

This study, like many others, had some limitations. Information on the dominant hemisphere (right- or left-handed), delay interval (time from the onset of stroke symptoms to reaching the stroke unit), risk factors, and thrombolysis was not collected and might be helpful in further analysis of results.

Acknowledgment

The authors wish to thank Nikola Bijelić, MD, for his valuable assistance in preparation of the manuscript. The study was supported by the Ministry of Science, Education and Sports, Croatia (project code 127-0000000-3421).

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Sažetak

AFAZIJA U BOLESNIKA S ISHEMIJSKIM MOŽDANIM UDAROM

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Afazija u bolesnika s ishemijskim moždanim udarom udružena je većom smrtnošću, sniženim stopama funkcijskog oporavka i smanjenom radnom sposobnošću. Cilj je bio ispitati učestalost i značajke afazije u bolesnika s ishemijskim moždanim udarom. U ovu prospektivnu kohortnu studiju bilo je uključeno 177 bolesnika (94 muškaraca i 83 žene) hospitaliziranih zbog ishemijskog moždanog udara na Klinici za neurologiju u Osijeku tijekom 2010. godine. Sve bolesnike pregledao je neurolog i logoped kako bi se utvrdila podvrsta moždanog udara i poremećaj govora. Studija je pokazala da afaziju ima 75 (42,4%) bolesnika (48,2% žena i 37,2% muškaraca). Ekspresivno-receptivna afazija bila je najčešći klinički tip afazije. Bolesnici s afazijom bili su statistički značajno stariji (75 prema 70 godina), a prevladavale su žene (53% prema 42%). Uz to, bolesnici s afazijom imali su trostruko veću učestalost moždanog udara velikih krvnih žila (51% prema 17%) i otprilike dvostruko veću učestalost kardioembolijskog moždanog udara (41% prema 22%). Učestalost moždanog udara lijeve polutke bila je gotovo dvostruka u afazičnih (61%) u usporedbi s neafazičnim (31%) bolesnicima. Istraživanje je pokazalo visoku učestalost afazije u bolesnika s ishemijskim moždanim udarom, koja se povećavala s dobi, bila je više izražena u žena, a najčešće se nalazila u bolesnika s moždanim udarom velikih krvnih žila i onih s kardioembolijskim moždanim udarom.

Ključne riječi: Ishemijski moždani udar; Afazija; Funkcijski oporavak; Epidemiologija

