

# ANOSOGNOSIA IN ACUTE STROKE AND ITS INFLUENCE ON EARLY FUNCTIONAL RECOVERY

Mirjana Vidović, Adnan Burina, Omer Ć. Ibrahimagić, Dževdet Smajlović

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**Authors:**  
Mirjana Vidović,  
Adnan Burina,  
Omer Ć. Ibrahimagić,  
Dževdet Smajlović

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**Affiliations:**  
Department of Neurology, University  
Clinical Centre Tuzla, Medical Faculty,  
University of Tuzla, 75 000 Tuzla,  
Bosnia and Herzegovina

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**Corresponding author:**  
Mirjana Vidović  
Department of Neurology  
University Clinical Centre Tuzla  
Telefon: 061 729 504  
Email: vidovic\_mirjana@hotmail.com

The aim of this study was to evaluate anosognosia in acute stroke in order to type of stroke and stroke localization as well as post-stroke patients recovery.

**Subjects and methods:** In this prospective analysis during the period July 1<sup>st</sup> through December 31<sup>st</sup>, 2005. 191 patients were included with first-ever stroke treated at the Department of Neurology of the University Clinical Center in Tuzla. All patients were tested to anosognosia in acute stroke according to the modified Bisiach scale, while the level of disability was assessed using the Rankin scale and level of functioning in daily activities using the Barthel index. Re-testing was done five weeks after the stroke.

**Results:** Ischemic stroke had 168 patients [88%] while 23 [12%] the hemorrhagic one. The lesions localized to the right hemisphere were in 111 [58.11%] patients and in the left hemisphere in 80 [41.89%] patients. Anosognosia was verified in 28% of patients in acute stroke, more often caused by lesions in the right hemisphere [36; 32.43% / 18; 22.5%,  $p=0.1$ ]. Anosognosia was significantly higher in patients with hemorrhagic stroke [13; 56.52% / 41/ 24.40%,  $p=0.002$ ]. Functional disability in patients with anosognosia at first test was statistically more significant [Rankin scale: 29; 87.9% / 51; 60.7%,  $p=0.008$ ; Barthel index: 24; 72.8% / 30; 35.7%,  $p=0.0007$ ] as well as at re-testing [Rankin scale: 12; 36.4% / 13; 15.5%,  $p=0.02$ ; Barthel index: 15; 45.5% / 11; 13.1%,  $p=0.0004$ ].

**Conclusion:** Presence of anosognosia in patients with stroke vitally influenced patient's functional status in re-testing phase just as well as in the acute stroke.

**Key words:** anosognosia, stroke, functional recovery.

## INTRODUCTION

Anosognosia is defined as patient's unawareness or inability to recognize the neurological deficit. Since they do not recognize the problem, persons with these difficulties do not ask for medical help on time, thus often lose valuable time for specific therapy like thrombolysis [1, 2]. Therefore, anosognosia often remains unknown in acute phase of stroke. In literature, incidence of anosognosia extensively varies, ranging from 5% to 28% [3, 4]. Analyzing the published studies in the period from 1990 thorough 2007, the incidence of anosognosia ranging from 7% to 77% [4]. Different approaches in estimation of anosognosia could explain such a wide frequency of anosognosia [5, 6]. The structured interview as a method for estimating anosognosia has limitations because it provides mostly qualitative information on the presence of anosognosia [4]. However, in the acute phase of stroke, a structured interview is a quick and easy method of assessment to gain insight into the patient's condition. Long and complicated tests in the acute

phase would not endure many patients. Verifying anosognosia already in the acute phase can help prevent complications such as patient falls and injury. On the other hand, the rehabilitation plan must be individualized, focused on the neuropsychological problem of the patient, which can facilitate the day-to-day functioning of the patient upon leaving the stationary facility. Therapeutic approach to patients with anosognosia is more complex compared to patients without anosognosia [7].

The aim of this study was to evaluate anosognosia in acute stroke in order to type of stroke [ischemia or hemorrhage] and stroke localization as well as post-stroke patients recovery.

## MATERIAL AND METHODS

In this prospective analysis were included of 191 patients [96 males and 95 females] with first-ever stroke at the Department of Neurology, University Clinical Center in Tuzla treated in period July 1<sup>st</sup> through December 31<sup>st</sup>, 2005. The diagnosis was

established according to the clinical picture, neurologic examination and computerized axial tomography [CT scan] of the brain. The average age of patients was 66.41 [mean age ± 10.21] years. Out of 191 patients, 168 [88%] had ischemia and 23 [12%] hemorrhagic one. The lesions localized to the right hemisphere were in 111 [58.11%] patients as well as in 80 [41.89%] patients with lesions localised to the left hemisphere.

All patients were tested on anosognosia presence in acute phase of stroke [between 4th - 7th day of hospitalization] using the modified Bisiach scale [8] which included the following levels:

0 – there is no anosognosia [as an answer to the general question “What are your major problems?”, the patient states his deficit, i.e. the weakness of his left or right extremities].

1 – mild anosognosia [patient mentions his deficit only as an answer to the specific question “Is your left or right arm i.e. is your left or right leg any weaker than the other one?”].

2 – moderate anosognosia [patient becomes aware, that is, he admits his neurological deficit only after a demonstration during the regular neurological examination technique].

3 – serious anosognosia [during the neurological examination, we do not get the patient’s confirmation that he is aware of it].

The patients were invited for the follow-up and re-testing five weeks after the stroke. 117 patients were re-tested while the other 74 of them did not show

up due to different reasons [address changes, death, remoteness of their place of residence, financial problems]. The re-tested patients were divided into two groups. The first group consisted of patients with presence of anosognosia in acute stroke [33; 61.11% of patients tested in acute phase]. The other group consisted of patients who did not have anosognosia [84; 61.31% of patients who were tested in acute phase]. Both groups were analyzed for the level of disability using the Rankin scale [9], and the level of functioning in daily activities using the Barthel index [10].

The study didn’t include patients with subarachnoid hemorrhage, recurrent stroke, severe speech impairment (aphasia), as well as patients that were not possible to get the testing due to their serious medical condition.

The SPSS program [Statistical Package for Social Sciences, Inc., IL] was used to analyze the results. The used statistical parameters were: median value, standard deviation, cross tabulations, Chi-square test. The value of p<0.05 was considered significant.

**RESULTS**

Anosognosia was present in 54 [28.27%] of all analyzed patients with initial results [4 to 7 days of hospitalization] which pointed out higher incidence in patients with lesion to the right hemisphere [36; 32.43% / 18; 22.5%] but with no statistical significance [p=0.1]. In order to type of stroke incidence of anosognosia was more significant in patients with hemorrhagic stroke [13; 56.52% / 41; 24.40%] [p=0.002] [Table 1].

**Table 1.** Distribution of anosognosia according to localization of lesion and type of stroke

Sample	Anosognosia		p
	n	%	
Right hemisphere lesion [n=111]	36	32.43	0.1
Left hemisphere lesion [n=80]	18	22.50	
Ischemic stroke [n=168]	41	24.40	0.002*
Hemorrhagic stroke [n=23]	13	56.52	

\*Significance

In Table 2 are notified the localization of lesion in patients with anosognosia.

**Table 2.** Localization of lesion in patients with anosognosia

Lobes	Side of localization				Total	
	Right		Left		n	%
	n	%	n	%		
Frontal	2	3.70	2	3.71	4	7.41
Parietal	21	38.90	4	7.40	25	46.30
Temporal	9	16.67	4	7.40	13	24.07
Occipital	/	/	2	3.71	2	3.71
Capsulla	4	7.40	4	7.40	8	14.80
Other localization	/	/	2	3.71	2	3.71
<b>Total</b>	36	66.67	18	33.33	54	100.00

Mild anosognosia was present in 28 patients [16 of them with lesion localized in the right hemisphere and 12 of them in the left one] and, the moderate and serious ones were present in 26 of them. Table 3. shows the severity and the incidence of anosognosia with respect to the lesion hemisphere locality.

**Table 3.** Incidence of anosognosia severity with respect to lesion locality

Anosognosia type		Right hemisphere lesion		Left hemisphere lesion	
	n %	n	%	n	%
Mild	28 51.85	16	29.63	12	22.22
Moderate	12 22.22	9	16.66	3	5.56
Serious	14 25.93	11	20.37	3	5.56
Total	54 100.00	36	66.66	18	33.34

Table 4. shows that the disability in acute stroke phase and in re-testing was more significant in patients with anosognosia.

**Table 4.** Functional disability in patients with or without anosognosia

Groups of patients	Rankin scale Serious and severe disability (% of patients)		Barthel index serious and complete dependence in daily activities (% of patients)	
<b>Acute phase</b>				
Group with anosognosia	87.9%	p=0.008*	72.8%	p=0.0007*
Group without anosognosia	60.7%		35.7%	
<b>Week five</b>				
Group with anosognosia	36.4%	p=0.02*	45.5%	p=0.0004*
Group without anosognosia	15.5%		13.1%	

\*Significance

In acute phase [between 4th to 7th day after stroke onset], in patients with anosognosia, 29 of them [87.9%] had serious and severe disability. In the group of patients without anosognosia, serious and severe disability was present in 51 [60.7%] [p=0.008] of them. Five weeks after stroke, in the group that showed some form of anosognosia in acute phase, serious and severe disability was present in 12 [36.4%] patients. In the group without anosognosia, serious and severe disability was present in 13 [15.5%] patients [p=0.02]. Concerning the level of dependence both in acute stroke phase and in re-testing period, functioning in daily activities [Barthel index] statistical significance were poorer in patients with anosognosia.

In patients with anosognosia in acute phase, serious and complete dependence in daily activities had 24 [72.8%] patients. In the group without anosognosia in acute phase, serious and complete dependence in daily activities was present in 30 [35.7%] patients [p=0.0007]. Five weeks after stroke onset, in the group with anosognosia, serious and complete dependence was present in 15 [45.5%] patients compared with 11 [13.1%] patients without anosognosia [p=0.0004].

## DISCUSSION

Reports on anosognosia incidence in patients with stroke are significantly various. In the study of Stone

et al., anosognosia had 28% of patients with the right hemisphere damage and in 5% with the left hemisphere damage [3]. In the study of Jorgensen et al., [11] with 566 acute stroke patients, anosognosia was present in 21% of patients, while Starkstein et al., [12] find it in 28% in their study. In our prospective study, the incidence of anosognosia is 28.27%. In patients with the right hemisphere lesion, anosognosia was verified in 23.43%, and with the left hemisphere lesion in 22.5% of patients. No statistical difference was found with respect to the lesion hemisphere locality. Analyzing 46 patients with acute stroke, Hartman-Maeir [13] find anosognosia in 28% of cases with the right hemisphere lesion and 24% of cases with the left hemisphere lesion. In the sample of 128 patients, Baier and Karnath [4] find anosognosia in 23% of patients, but they find the level of "mild anosognosia" questionable [patient mentions his deficit only when asked a specific question about the weakness of extremities]. In other words, according to them, 60% of patients with mild anosognosia actually do not have anosognosia, and they spontaneously do not mention weakness of right or left extremities because, at that moment, there are more important symptoms for them [those that bother them more], such as ptosis, speech impairment, and headache. Neurological deficit in patients without anosognosia or in those with the mild one, did not show important statistical difference. When this criterion is applied, according to them, there is less incidence of anosognosia and is about 10% to

18%. In our study, mild anosognosia was present in 28 [51.85% from the total number of patients with anosognosia], and moderate and severe in 26 [48.15%] patients. If we apply the Baier and Karnath [4] criteria [patients with anosognosia do not actually have it], in our study, the incidence of anosognosia would be 13.61%.

The incidence of anosognosia in our study was significantly higher in patients with hemorrhagic stroke [56.52%] in order to the ischemic one [24.40%].

In favor of this are the results published by other authors who find that the reason for anosognosia is the existence of massive lesions [12, 13]. Anosognosia in this study was more frequently induced by lesions to the right hemisphere but the difference was not statistically significant. Some other authors [15] also pointed out that the localization of lesion is of less importance for anosognosia and according to them patients with anosognosia were older, and they often had pre-stroke dementia. No particular lesion localization was associated with anosognosia.

The presence of anosognosia in this study in patients with stroke caused both significant disability and

worsening daily activities in acute phase [first week after stroke], as well as five weeks after stroke. Results of other authors also show that patients with anosognosia in acute phase of stroke have lower Barthel index and lower level of independence [16]. Therefore, a special plan for stimulation and help in mobilization is necessary for these patients [12, 17]. Jehkonen et al, [6] made analysis of 27 studies, published in the period from 1995 to 2005, and all of the studies confirmed the fact that patients with anosognosia have worse functional recovery. Results in some other papers were similar [18, 19].

## CONCLUSION

Anosognosia was verified in 28% of patients in acute phase of stroke, more often caused by the right hemisphere lesions. Significantly higher incidence of anosognosia was present in patients with the hemorrhagic stroke, and more frequent caused by massive lesions localized in the right hemisphere. Anosognosia in patients with stroke caused both significant disability and significantly worse functioning in daily activities in acute phase and early post stroke period.

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