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Relationship of Speech and Language Disorders to Lateralization of Functional Impairments After Stroke

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Abstract

Introduction Frequent consequence of a stroke is disturbances of communication expressed through difficulties or completely lost of ability for expression and / or understanding of speech.Aim of study is to determine SLD presence in relation to patient age, sex, functional impairment side of the body and the smoking habits.Methodology We took data from the medical records of 746 patients included in the rehabilitation after stroke. Results Average age of the sample was 67.50 years. Over one third of patients had registered two or more diseases. The most common type of stroke is ischemic. Near ¾ samples with right-sided, about 1/5 sample with the left sided, third with bilateral functional impairments of the body and one-quarter of patients without significant functional impairment had SLD. Conclusion Most of the samples with right-sided functional impairments body had SLD; a smaller part of the left sided functional impairments had presented SLD.

Index terms— stroke, speech and language disorders, functional impairment, laterasation.

educed, or completely interrupted blood flow to certain parts of the brain, caused by a variety of factors is the most common cause of stroke. There is a reduced or absent ability for speech and language communication, frequently, as a result of a stroke.

Stroke became comprehensive socio-economic and health problem what is obvious from estimation which shows that in the USA there are more than five million people who have survived stroke. From them, 33% have a speech language disorder (SLD). It Prediction for the future is growth of rates in the socalled third age, especially in the developed countries of the world. Ageing will also increase the incidence of stroke, and number of people with damaged speech and language communication. follows that the USA is currently home to more than a million people with aphasia or other SLD (8).

In Italy, approximately 150,000 people suffer from aphasia after stroke. Although most people regain at least some language functions, between 30 and 43% of those affected remain severely aphasic 18 months after stroke. Among different language functions, difficulty finding words are usually most frequent, pervasive and persistent disorder (4).

In developed countries, the incidence of stroke is declining -mainly due to preventative measures. Day JC. (2001) According to research by the American Centers for Disease Control and Prevention and heart attack and stroke, published by the American Heart Association, the risk of ischemic stroke among smokers is doubled compared to non-smokers, regardless other risk factors. Atrial fibrillation is an independent risk factor for stroke, and it increases the risk of stroke by about five times. High blood pressure is the most important risk factor for a stroke (14).

Functional damage will occur in different modalities depending on the localization of brain damage.

Effects on sensory and motor functions of the body are usually expressed through the degree of neurological deficit. Pathological changes in the brain caused by stroke are topographically deployed at different sites of the brain. Concerning functionally impaired side of the body, Savic, G. & Iriskic A. (2011) I. Introduction on a sample of 681 patients were found that 46.5% of the sample was from the right-sided, 42.7% of the leftsided

and 4.55% with bilateral impairments. For 6.2% of the sample there was no information about lateralization of neurological disorders (10).

On the same sample was found that in the beginning of rehabilitation, 37% of the sample had show significant speech and language impairments. Presence of SLD was for right-sided damaged 67.32%, 22.57% for left-sided and with both sides was 4.57%. Missing data for 5.14% of the sample. Processes and activities of certain brain regions involved in speech communication are rarely present in both hemispheres. Speaking, reading and writing are controlled by the left hemisphere. Less known is the role of the right hemisphere and subcortical areas in these functions. Lexical and grammatical knowledge show hemispheric specialization. Speech and language functions are predominantly a function of the left hemisphere, i.e. the left hemisphere is dominant for language in most people. Right hemisphere has role in the understanding of prosody (the color and tonality of verbal statements). Research shows that the brain lobes have different roles in speech (9).

1 II. The Aim of the Research

The aim of the study was to describe some of qualitative and quantitative variables at patients in period in one year after stroke. The data refer to: -Characteristics of the sample concerning age, sex, comorbidity, and the time onset stroke. -Relationship between speech and language disorders to sex, age, type of stroke, smoking, and lateralization of functional impairment the body after stroke.

2 III. Methodology

IV.

3 Results

Figure no 1 : Age in relation to the occurrence of speech and language disorders (SLD)

The research is based on an analysis from anamnesis data taken from medical records of patients involved in rehabilitation and speech therapy after a stroke in the Neurology department IPRM Dr M. Zotovi? in Banja Luka, in the period 01.03.2011.to 29.02.2012. The sample is 746 patients. After entering the data into a software program SPSS for Windows v.17 results obtained on age, gender, etiology of stroke, functional damage to the body, the presence of smoking, were set up a relationship with the emergence of SLD. From the results we get adequate conclusions.

4 V. Discussion

In the rehabilitation has been involved 746 patients with stroke. From the anamnesis data, taken from medical records, during the acute phase of the disease, were registered speech and language problems in 323 patients, or 43.3% of the entire sample. Frequency of males is bigger compared to females (54.69%: 45.30%) what is consistent to the results of some research in these geographic areas (10,11,12) but not in line with other research which presents These risk factors were also higher because for about a third (32%) of the sample were not specified causes because of incomplete data (5).

In the sample were registered 75 different localizations of brain damage which left various functional effects on patients. The most frequent are the consequences in hemiplegic or hemiparesis modalities. The lesions were located on the left, right or both cerebral hemispheres. For 323 patients with SLD largest number of brain lesions is located: multifocal in 56 patients; as CT or MRI findings described as "a lesion in the area of irrigation left MCA" in 21 patients; parietal lobe left in 19 patients; Parietal temporal lobe left at 16 patients; frontal parietal lobe left at 15 patients; frontal parietal temporal lobe left at 13; temporal lobe left at 13; the basal ganglia bilaterally at 9 patients; supratentorial bilateral at 8 patients; frontal lobe left at 7; the basal ganglia left at 7; para and supraventricular left at 7; that 70.83% of patients with right-sided functional para ventricular bilaterally at 7; in the cerebellum at 6; front temporal lobe left in 5 patients. Beside this, brain lesions at 36 locations were found at other patients with SLD.

Kirshner SH, Jacobs HD. (**??**009) found that language function lateralizes to the left hemisphere in 96-99% of right-handed people and 60% of left -handed people. Of the remaining left -handed people, about one half have mixed hemisphere language dominance, and about one half has right hemisphere dominance. Lefthanded individuals may develop SLD after a lesion of either hemisphere, but the syndromes from left hemisphere injury may be milder or more selective than those seen in right-handed people (6). Knecht et al. (2000) found that in most people, the left side of the brain contains language centers. The incidence of right hemisphere language dominance was found to increase linearly with the degree of lefthandedness, from 4% in strong right-handers to 15% in ambidextrous individuals and 27% in strong left hander's (7). data on the greater representation of females **??**1, 13, 14, etc..). Differences in the gender structure significantly affect by the cultural, socio-economic, geographic and other factors.

Studies in the USA indicate that the incidence of stroke is higher in females at younger ages, whereas it is vice versa in the older age groups (14). In our study, the incidence in males was higher up to 75 years. After 75 years of age, the incidence was increased in females.

The study of etiology of stroke in Serbia, with a sample of 865 patients with ischemic stroke, aged 15¬45 years found the ratio of 486: 379 (56.18%: 43.82%) in favor of males (5).

The most common type of stroke in the sample is ischemic stroke (72%). Intracerebral hemorrhage followed with 10.3%, the combination of ischemia and intracranial hemorrhage with 1.5%, and other types of stroke. Data on the type of stroke in the medical records were not found for 11.8% of the sample (Table no. 2).

Analysis of the age structure in relation to the type of stroke in patients with SLD, we found that at 172 patients with ischemic stroke average age was 67.41 years; 24 patients with HIC were younger, had 59.29 years in average.

In 90.0% of patients from the sample, in medical records were registered some diseases which are risk factor for a stroke. The majority of patients had registered two or more diseases. Mostly, it was a combination of heart disease, diabetes mellitus or arterial hypertension. Sequentially registered are diseases as hypertension, heart disease, diabetes and other diseases as shown in the Table no 3.

Results about relationship of age and the onset of stroke, shows that patients in the category of smokers in average had a stroke with 62.88 years. For non smokers, average occurrence of stroke is six years later, average 68.71 years (Table no 4).

Approximately one third of patients in SLD category were smokers, occasional smokers or former smokers. From the category of patients without SLD 25.05% were smokers, occasional smokers or nonsmokers.

Jovanovic, D. et al **??**2008) exploring the etiology of stroke in younger patients (15-45 years) found that the most commonly present risk factors were smoking In the first 10 days of the occurrence of stroke in rehabilitation were included 13 patients or 1.7% of the sample; 30 days after, 50.8%; 60 days 74.9%; to 90 days, 81.1% of the sample. In the first 6 months after stroke in rehabilitation was included 85.1% of the sample. During the first year of the onset of stroke in rehabilitation was included 88.1% of the whole sample and over a year of stroke were included 11.9% of the sample. Big number of patients was at the renewal of treatment (Table no 1).

In the sample we found approximately equally represented right-sided and left-sided functional impairments of the body (Table No. 5). Patients with right-sided functional impairments of the body were present in 31.9%, with left-sided 8.7%. We found that 70.83% of patients with right-sided functional impairments body had SLD. This confirms findings of Kirshner SH, Jacobs that language function is lateralized in the left hemisphere in most right-handed and 60% left-handed people (6). Damage to the left hemisphere, had consequences in functional impairment right side of the body, some other functions, as well as some modalities of speech and language. 18.95% of patients form the group with functional impairments of left side of the body had SLD. Damage to the right hemisphere consequently have functional impairments of left side of the body but also speech and language centers in patients with right hemispheric dominance, what is consistent with studies conducted by Knecht et al. (7). 34.48% of patients with bilateral functional impairments had presented SLD. These patients had damaged both cerebral hemispheres. The patients who had damages located at the sites responsible for speech and language functions had SLD.

5 VI. Conclusion

The occurrence of SLD as a result of stroke depends on localization, extent and size of brain lesions. The incidence of stroke is worrisome in a large workingage population.

The largest part of the sample with a right-sided functional impairments body had SLD, as a consequence of the lesion of centers for speech and language function.

A smaller proportion of patients with functional impairments of left side of the body had present GJP. Patients with bilateral functional impairments had a significant presence of SLD, as a consequence of the lesion of centers for speech and language function.

Most of the patients had registered, in the medical records, some of the diseases that pose a risk factor for stroke. This leads us to urgent taking measures to prevent the onset and appropriate treatment of these diseases.

Figure 1:

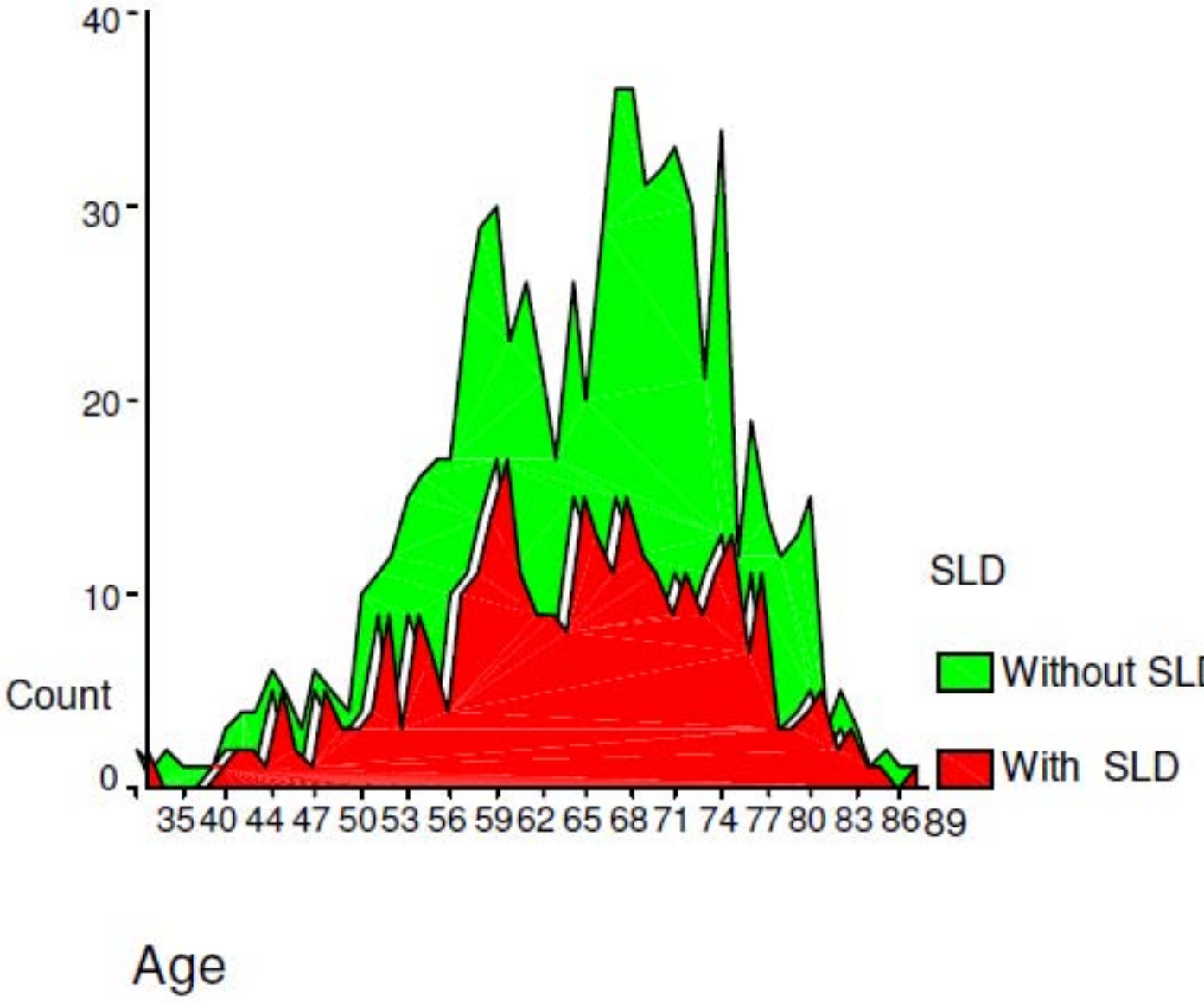

Figure 2:

Patients	Day onset stroke ≤ 30		Day onset stroke ≤ 60		Day onset stroke ≤ 180		Total
	N	Percent	N	Percent	N	Percent	
Without SLD	204	48.2	285	67.4	343	81.1	423
With SLD	174	54.2	274	84.8	292	90.4	323
Total	379	50.8	559	74.9	635	85.1	746

Figure 3:

Typ of stroke	Patients without SLD		Patients with SLD		Total	
	N	Percent	N	Percent	N	Percent
Ischemia	296	39.7	241	32.3	537	72.0
Intracranial hemorrhage	44	5.9	33	4.4	77	10.3
Ischemia with HIC	3	0.4	8	1.1	11	1.5
Subarachnoid hemorrhage	5	0.7	2	0.2	7	0.9
Ischemia/atrophia	4	0.6	2	0.2	6	0.8
Missing data	58	7.8	30	4.0	88	11.8
Other	13	1.7	7	1.0	20	2.7
Total	423	56.7	323	43.3	746	100.0

Figure 4:

Comorbidity	Patients without SLD		Patients with SLD		Total	
	N	Percent	N	Percent	N	Percent
Hypertension arterials	103	13.8	82	10.9	185	24.8
Thrombosis	0	0	2	0.3	2	0.3
Tm cerebral	5	0.6	4	0.5	9	1.2
Diabetes mell.	27	3.6	21	2.8	48	6.4
Heart disease	49	6.5	50	6.7	99	13.3
Two and more factors	155	20.7	108	14.4	263	35.3
Other	33	4.4	19	2.5	52	7.0
Atherosclerosis	3	0.4	3	0.4	6	0.8
Unknown	13	1.7	18	2.4	31	4.2
No risk factors	35	4.6	16	2.1	51	6.8
Total	423	56.7	323	43.2	746	100.0

Figure 5:

Almost one quarter of stroke occurring in people under age 65 years (14).

measures for cerebrovascular diseases are: age, gender, race, ethnicity, genotype, previous myocardial infarction, transient ischemic attack or stroke. Risk factors that may be controlled by preventive measures and hypertension, atrial fibrillation, coronary and/or peripheral arterial disease, obesity, physical inactivity, stress, alcohol and tobacco abuse (3).

Risk factors that can't be control by pr

treatment are diabetes, hyperlipidemia,

Figure 6:

no

Figure 7: Table no 1

no

Figure 8: Table no 2

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Figure 9: Table no 3

no

Figure 10: Table no 4

no

Figure 11: Table no 5

[Kirshner et al. (ed.) (2014)] , S H Kirshner , H D Jacobs , Pathophysiology Aphasia . http://emedicine.medscape.com/article/1135944¬overview#showallAccessed eMedicine. Medscape (ed.) July 17 2014.

[Savic and Iriskic (2011)] *Aphasia as a result of brain damage, Proceedings of the 2nd Congress psychologists Bosnia and Herzegovina with international participation*, G Savic , A Iriskic . 2011. February 24-26., 2011. Banja Luka. p. .

[Jovanovi? et al. ()] *Etiology of ischemic stroke among young adults of Serbia*, D R Jovanovi? , L Besla?-Bumba?irevi? , R Rai?evi? , J Zidverc-Trajkovi? , M D Ercegovac . 2008. 65 p. .

[Knecht ()] 'Handedness and hemispheric language dominance in healthy humans'. Knecht . *Brain* 2000. 123 p. .

[Brki? et al. ()] 'Incidence and Clinical Phenomenology of Aphasic Disoders After Stroke'. E Brki? , O Sinanovi? , M Vidovi? , Smajlovi? D? . *MED ARH* 2009. 2009. 63 (4) p. .

[Smajlovic ()] 'Main epidemiologic characteristic of cerebrovascular diseases in patients hospitalized at Tuzla Department of Neurology during a five-year post-war period'. D Smajlovic . *Centers for Disease Control and Prevention and the Heart Disease and Stroke Statistic / 2010 Update*, 2002. 1996 -2000. 2002. American Heart Association. 41 p. . (Suppl. 3)

[Day ()] 'National population projections'. J C Day . http://www.census.gov/populaton/www/pop-profile/natproj.html *Wasington,DC: US. Census Bureau*, 2001.

[Savic ()] 'Nomination ability in patients with speech and language impairment after stroke'. G V Savic . *Curr Top Neurol Psychiatr Relat Discip* 2013. 2013. 21 (1-2) p. .

[Manheim et al. ()] *Patient-reported changes in communication after computer-based script training for aphasia. Archives of physical medicine and rehabilitation*, L M Manheim , A S Halper , L Cherney . 2009. 90 p. .

[Demarin et al. ()] 'Stroke: A historical overview and contemporary management'. V Demarin , M ?iki ? , T Rabi -?iki? . *Curr Top Neurol Psychiatr Relat Discip* 2011. 19 (2) p. .

[Gandolfi and Luisa ()] *The neural mechanism underlying etc. mechanisms underlying recovery of aphasia in patients with left hemisphere stroke, doctoral thessis*, Maria Gandolfi , Luisa . http://www.univr.it/main?ent=catalogoaol&id=351873&page=dettagli-oPubblicazione&lang=en 2011.

[Savic et al. (2014)] 'Understanding the commands at the patients after stroke, Abstract for IX World Stroke Congress'. G Savic , L Rakic , N Stjepanovic . *International Journal of Stroke* 2014. 2014. December 2014. 9 p. 239. (World Stroke Organization. Suppl.3)

[Ristic ()] 'Visualization of cortical speech areas by implementing of functional neuroimaging techniques'. S Ristic . *In Research in Special Education and Rehabilitation* 2009. 2009. p. . University of Belgrade/ Faculty of Special Education and Rehabilitation