Etiological factors as predictor of rehabilitation in patients after carebrovascular insult

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Abstract

Introduction: Cerebrovascular insult (CVI) is acute or sub-acute occurrence of symptoms which signal death of cerebral cells caused by localized disruption of arterial circulation in the brain. The goal of this study is to investigate whether ischemic or hemorrhagic CVI can be used as predictor of rehabilitation.

Methods: A retrospective study was conducted in the period from January 2009 to the December 2009 and as a source of data we used medical records. The study included 89 patients who had CVI and who were hospitalized at the Clinic for Physical medicine and rehabilitation, Clinical Center University of Sarajevo (KCUS). We analyzed socio-demographic variables such as gender and age and clinical variables: the diagnosis, the length of stay in hospital (LOH), and Barthel index (BI) at admission and discharge from hospital.

Results: Out of 89 patients, 78/89 (87.6%) were patients with ischemic CVI (group A), and 11/89 (12.4%) with hemorrhagic CVI (group B). There was not a significant association between the gender and type of CVI [($\chi 2(1)= .041$, $P> .05$]. There was a statistically significant difference in median of length of hospitalization (LOH) between two groups ($U=186.5$; $z=-3,025$; $P= .002$). There was not a statistically significant difference in median of BI at admission ($U=317.0$; $z=-1,399$; $P= .162$) and discharge ($U=319.0$; $z=-1.374$; $P= .169$) between two groups.

Conclusion: Patients with hemorrhagic CVI have a longer stay in hospital and consequently more expensive cost of treatment.

Keywords: cerebrovascular insult (CVI), etiology, rehabilitation, length of stay in hospital (LOH)

Introduction

Cerebrovascular insult (CVI) is acute or subacute occurrence of symptoms caused by localized occlusion in arterial circulation in the brain (1). Acute form of this disease is marked as stroke, apoplexy or brain attack. It is the third cause of illness and mortality as well as leading cause of disability in the world (1, 2). Etiological classification explains the causes that led to this condition, and the most common causes are vascular lesions in the brain that can generally be divided to hemorrhagic lesions and ischemic CVI which can be consequence of embolism and thrombosis (1, 3). Sequelae of CVI are: clinical paralysis affecting one side of the body, hemiparesis if it has smaller intensity and hemiplegia if it has increased intensity (4). Rehabilitation is inseparable part of treatment after CVI and patients should start it as soon as they are medically in stabilized. Rehabilitation itself is a complex process which has an aim to maximize functional independence of every individual patient. Together with medication therapy which is immediately introduced, active approach to rehabilitation is of utmost importance in such patients (5,6). The first part of rehabilitation, which takes place in the Stroke Units of the Neurological Clinic, is considered early-stage rehabilitation. For this period, it is important to emphasize that there is a difference in rehabilitation in regard with etiological cause of CVI. In case that patient's general condition is stable active approach to rehabilitation is recommended 72 hours after ischemic CVI occurred. If cause of the insult is hemorrhagia, caution is rec-

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ommended in first two or three weeks after CVI. Such patients require additional follow-up and well dosed therapy in the rehabilitation process. After the treatment and upon completion of this rehabilitation part it is recommended to continue rehabilitation in specialized facility, which is considered late-stage rehabilitation. The goal of this study is to investigate whether ischemic or hemorrhagic CVI can be used as predictor of rehabilitation.

Methods

A retrospective study was conducted in the period from January 2009 to the December 2009 and as a source of data we used medical records. The study included 89 patients who had CVI and who were hospitalized at the Clinic for Physical medicine and rehabilitation, Clinical Center University of Sarajevo (KCUS). We analyzed socio-demographic variables and clinical variables: the diagnosis, the length of stay in hospital (LOH), and Barthel index (BI). The Barthel scale or Barthel ADL index is an ordinal scale used to measure performance in activities of daily living (ADL). Each performance item is rated on this scale with a given number of points assigned to each level or ranking (7). It uses ten variables describing ADL and mobility. A higher number is associated with a greater likelihood of being able to live at home with a degree of independence following discharge from hospital. The measuring was performed at admission and discharge from the KCUS. The inclusion criteria were: patients aged over 18, patients who had CVI followed by neurological deficit, patients who completed acute treatment with medications at Neurological Clinic, patients who started rehabilitation at the Clinic for Physical medicine and rehabilitation not more than one month after cerebrovascular insult. The exclusion criteria (following the use of therapeutical possibilities) were: rapid regression of neurological symptoms, gastrointestinal or urinary bleeding within last 21 days, myocardial infarct within last three months, evidence of active bleeding, acute trauma or fracture and patients who died or transferred to another clinic. The Kolmogorov–Smirnov statistic test with a Lilliefors significance level was used for testing normality. Results are expressed as median and interquartile range (IQR) in case of continuous non-normal distributed variables. In case of categorical variables, counts and percentages were reported. Statistical analysis was performed with Mann-Whitney U-test, Wilcoxon Signed Rank test and Chi-Square test. A P-value < .05 was considered as significant. Statistical analysis was performed by using the Statistical Package for the Social Sciences (SPSS Release 19.0; SPSS Inc., Chicago, Illinois, United States of America) software.

Results

Out of 89 patients, 78/89 (87.6%) were patient with ischemic CVI (group A), and 11/89 (12.4%) with hemorrhagic CVI (group B). In group A, the frequency of males was 40/78 (51.3%), in group B was 6/11 (54.5%). There was not a significant association between the gender and type of CVI [($\chi 2(1)$= .041, P> .05]. The median age was 66 years (IQR=59 to 73 years) in group A, and 69 years (IQR=64 to 74 years) in group B. There was not a statistically significant difference in median age between two groups (U=367.0; z=- .774; P= .439). The highest number of patients in both groups was between 60-80 years of age (Fig. 1). In group A, the median of LOH was 32 days (IQR=23.8 to 40.3 days), in group B was 46 days (IQR=39.0 to 69.0 days). There was a statistically significant difference in median of LOH between two groups (U=186.5; z=-3,025; P= .002) (Fig. 2). In group A, the median of BI at admis-

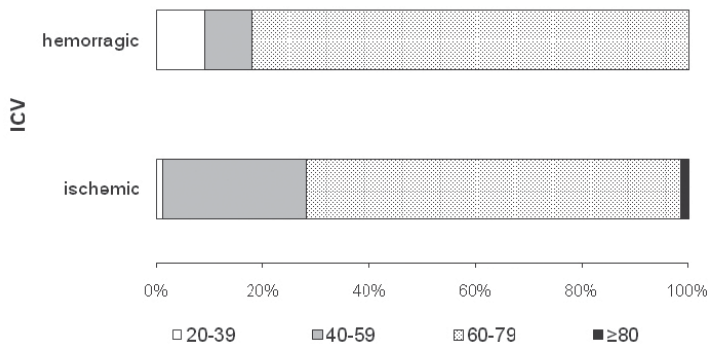

FIGURE 1. Distribution of patients' age in both groups

TABLE 1. Descriptive statistics of patients with CVI who were hospitalized at the Clinic for Physical medicine and rehabilitation, Clinical Center University of Sarajevo, 2009, *(n=89)*

Variables	CVI	n	Min.	Max.	Percentiles			P-value
					25-th	50-th	75-th	
Age (years)	0†	78	38	82	59.0	66.0	73.0	*.439*
	1‡	11	29	78	64.0	69.0	74.0	
LOH (days)	0	78	7	74	23.8	32.0	40.3	*.002*
	1	11	19	84	39.0	46.0	69.0	
BI *	0	78	0	20	2.0	8.0	15.0	*.162*
	1	11	0	12	2.0	5.0	9.0	
BI **	0	78	2	20	8.0	14.0	18.0	*.169*
	1	11	4	17	8.0	11.0	14.0	

0† ischemic; 1‡ hemorraggic; BI* Brathel index at admission; BI** Barthel index at discharge;

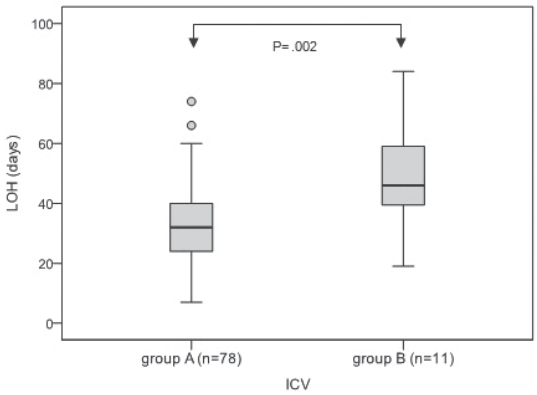

FIGURE 2. Box plot of LOH (days) in both groups

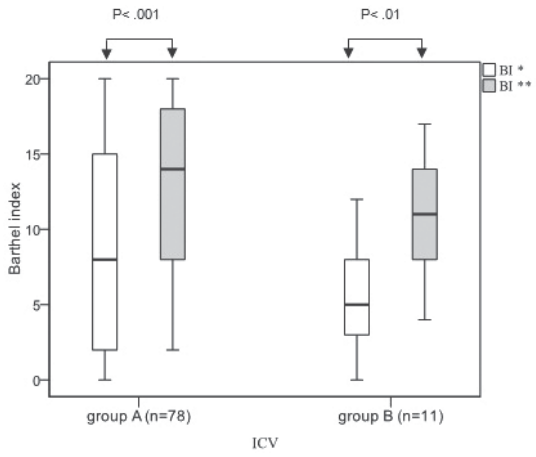

FIGURE 3. Box plot of Barthel index at admission and discharge in both groups (BI* Brathel index at admission; BI** Barthel index at discharge)

sion was 8.0 (IQR=2 to 15), in group B was 5.0 (IQR=2 to 9). There was not a statistically significant difference in median of BI at admission between two groups (U=317.0; z=-1,399; P= .162). In group A, the median of BI at discharge was 14.0 (IQR=8 to 18), in group B was 11.0 (IQR=8 to 14). There was not a statistically significant difference in median of BI at discharge between two groups (U=319.0; z=-1,374; P= .169). In group A, there was a highly statistically significant difference in median of BI between admission and discharge (Z=-7.105; P< .001). In group B, there was a statistically significant difference in median of BI between admission and discharge (Z=-2.956; P< .01)..

Discussion

In our study, the frequency of males was 51.3% in group A, and 54.5% in group B. These results are consistent with others similar studies (2, 8). There was not a significant association between the gender and type of CVI (P> .05). In group A, the highest number of patients (55/78 or 71%) was between 60-79 years of age, followed by, 21/78 (27%) between 40-59 years, 1/78 (1%) between 20-39, and 1/78 (1%) ≥80 years. In group B, the highest number of patients (9/11 or 82%) was between 60-79 years of age, followed by, 1/11 (9%) between 40-59 years, and 1/11 (9%) between 20-39 (Fig. 1). There was not a statistically significant difference in median age between two groups (P= .439). Our earlier research shows similar results which corresponding with the data from others studies (2,8,9).

In our study, the most patients (78/89 or 87.6%) had ischemic CVI, and 11/89 (12.4%) were patients with hemorrhagic CVI. These results are in agreement with results from medical literature (1,2,8). In group A, the median of LOH was 32 days, in group B was 46 days and there was a statistically significant difference in median of LOH between two groups (P= .002). Later start of active rehabilitation treatment for patients with hemorrhagic CVI causing longer rehabilitation process (8,9,10). In order to ensure faster and more economical recovery for the patients it is necessary to shorten duration of rehabilitation, which corresponds to the most recent data in the literature. This process is in patients' best interest, in their families' interest and it also reduces treatment costs. Rehabilitation after stroke continues in home program after completion of first phase of treatment (2,11,12). There was not a statistically significant difference in median of BI at admission and discharge between two groups, but there was a highly statistically significant difference in median of BI between admission and discharge in group A (P< .001), and group B (P< .01). These results are consistent with others studies (8,11,12,13).

Conclusion

Patients with hemorrhagic CVI have a longer stay in hospital and consequently more expensive cost of treatment.

Competing interests

Authors declare no conflict of interest.

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