

Short term evolution of post-stroke depression

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Abstract. Objective: The purpose of this paper is to assess the evolution of post-stroke depression over six months and to identify certain parameters as predictive factors for this consequence. Material and methods: The study included 82 consecutive patients with a median age of 66.5 (58.7 - 74) years; 20 (24.4%) women and 62 (75.6%) men. Patients were diagnosed with acute ischemic stroke and post-stroke depression. Initially, demographic data were recorded, including parameters such as age, gender and origin of patients (urban/rural). Head MRI was performed in the first check-up using a 1.5 Tesla magnetic resonance imaging scanner. Stroke location was defined in detail together with the presence of other cerebral lesions and the extent of cerebral atrophy, if present. Psychometric and neurologic tests were performed in the initial and six-month evaluation, which included the Beck Depression Inventory, the Geriatric Depression Scale (GDS), the NIHSS score, and the Barthel index. Results: the Barthel index, NIHSS and GDS were statistically significant different at six months as compared with the initial evaluation. The severity of the depression improved at six months post-stroke. The gender related improvement of severity of the depression over time was statistically significant. Patients without a frontal lesion showed an improvement regarding the severity or presence of the depression, as compared with the ones with frontal lesion. Patients without a prefrontal lesion showed an improvement regarding the severity or presence of the depression, as compared with the ones with prefrontal lesion. Conclusion: In conclusion, there was an improvement in the severity or persistence of post-stroke depression 6 months after ischemic stroke, which was influenced by patient gender and location of lesions.

Key Words: stroke, post-stroke depression, six months.

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Introduction

Post-stroke depression is a mood disorder such as negative hyperthymic associated with hypoprosexia, micromania, bradypsychia, decreased motor activity to psychomotor retardation, aboulia, which occurs secondary to acute stroke. Post-stroke depression is important to be recognized and re-evaluated periodically. Strict adherence to the evaluation protocol can lead to considerable improvements in quality of life in these patients. The increase in the incidence of ischemic stroke in the general population, its occurrence at younger ages and frequent comorbidities cause an increase in medical costs and socioeconomic burden. The occurrence of immediate complications, such as post-stroke depression, can determine a cautious prognosis in terms of both mental and motor recovery.

Several studies have shown that up to one-third of stroke patients develop post-stroke depression. This is associated with a higher risk of stroke recurrence, longer hospital stay, reduced mental and physical rehabilitation, low quality of life and increased rates of morbidity and mortality (Ayerbe et al 2013; Kutlubaev et al 2014; Hamid et al 2017).

Mpembu et al (2014) demonstrated that the incidence of post-stroke depression is high. One-year evolution showed that the number of patients with depression remains constant. The factors that influenced the evolution are: the lack of neuromotor and psychiatric rehabilitation and certain demographic characteristics (older age, female gender).

Sibon et al (2012) followed patients with post-stroke depression for three months and showed that the prevalence of depression remains the same. But the symptoms evolve over time. If initially anhedonia and fatigue were more frequent, negative thoughts, sadness or anxiety prevailed at the next examination. The immediate physical and psychological impact of the vascular event on the patient's social and physical status was identified as the underlying cause of this evolution.

Graven et al (2016) identified that after one year post-stroke patients had a positive evolution with less depressive symptoms in case of neurological rehabilitation.

The purpose of this paper is to assess the evolution of post-stroke depression over six months and to identify certain parameters as predictive factors for this consequence.

Materials and methods

This was an observational, analytical, cross-sectional, prospective, cohort study.

The study included 82 consecutive patients with a median age of 66.5 (58.7 - 74) years. Of these, 20 were women (24.4%) and 62 men (75.6%). Patients were diagnosed with acute ischemic stroke according to criteria described in the Guidelines for Treatment and Diagnostic in Neurology (Bajenaru 2010) and post-stroke depression according to Statistical Manual of Mental Disorders (DSM-IV-TR) criteria. Patients were followed for 6 months.

The patients refused therapy for depression in any form (cognitive-behavioral or pharmacological). They followed a multi-drug therapy for stroke and associated factors, and some of the followed individualized recuperation programmes.

The patients included in this study were admitted to the Neurology Clinic of Cluj-Napoca County Emergency Hospital between 2009 and 2011.

The study protocol was approved by the Ethics Committee of “Iuliu Hatieganu” University of Medicine and Pharmacy. The patients signed the informed consent form.

Inclusion criteria were as follows: clinical diagnosis of ischemic stroke confirmed by imaging techniques, age over 18 years, diagnosis of depression.

Exclusion criteria were as follows: patients who did not show up at the 6-month evaluation, patients who refused periodic examinations, patients who did not agree to sign the informed consent form, patient history of depression, history of treatment or diagnosis of mental disorders, haemorrhagic stroke, and aphasia. Initially, demographic data were recorded, including parameters such as age, gender and origin of patients (urban/rural). Head MRI was performed in the first check-up using a 1.5 Tesla magnetic resonance imaging scanner. Stroke location was defined in detail together with the presence of other cerebral lesions and the extent of cerebral atrophy, if present.

Psychometric tests were performed in the initial and six-month evaluation, which included the Beck Depression Inventory (BDI) containing 21 items that assess sadness, loss of control, hostility against the self, loss of self-esteem, appetite loss, sleep loss, somatic problems, sexual problems, irritability, concentration difficulties, difficulty working, and the patient had four possible responses ranging from zero to three, and the Geriatric Depression Scale (GDS) with 30 items that assess anhedonia, patient work, current and future expectations, the ability to concentrate, mood, memory and fear, and the patient gives yes or no answers. Quality of life (QOL) was also measured on a scale from 0 to 100 assessing patient perception of his/her life. The neurological evaluation comprised two tests, namely the NIHSS score, which includes the objective neurological assessment based on weighted evaluation findings, and the Barthel index, which assesses the patient’s ability to interact with the environment and the need for third-party care.

Statistical analysis was performed using the MedCalc Statistical Software version 17.6 (MedCalc Software bvba, Ostend, Belgium; <http://www.medcalc.org>; 2017). Comparisons between evaluation were performed using the Wilcoxon rank test or ANOVA for repeated measures. A p value lower than 0.05 was considered statistically significant.

Results

Thirty-four (41.5%) patients were from rural areas, and forty-eight (58.5%) patients were from urban environment. The lesion located in the frontal lobe was present in 27 (32.9%) patients. The lesion located in the prefrontal area was present in 29 (35.4%) patients. The lesion located in the basal nuclei was present in 44 (53.7%) patients. The lesion located in the temporal lobe was present in 32 (39%) patients. The lesion located in the occipital lobe was present in 16 (19.5%) patients. The lesion located in the parietal lobe was present in 16 (19.5%) patients. In 63 (76.8%) patients there were one or two concomitant

lesions and in 19 (23.2%) patients there were three or four concomitant lesions. The stroke was located in left hemisphere in 47 (57.3%) patients and in the right hemisphere in 35 (42.7%). Lacunar lesions were found in 43 (52.4%) patients. Cerebral atrophy was found in 38 (46.3%) patients.

Scales and scores evolution at six months post-stroke can be observed in table 1. QOL, Barthel index, NIHSS and GDS were statistically significant different at six months as compared with the initial evaluation.

Table 1. Scales and score evolution at six months post-stroke

Variable	Initial evaluation	Six months evaluation	p
QOL	60 (43.7; 76.2)	65 (45; 80)	<0.001
Barthel index	80 (75; 85)	80 (75; 85)	0.03
NIHSS	9 (7; 13)	8.5 (6; 12.2)	<0.001
GDS	21 (14; 24.5)	21 (13.7; 25.2)	0.007
BDI	19 (14; 23.5)	19 (12; 30.2)	0.4

We split the scales and scores according to the severity of the disease (table 2). The severity of the depression improved at six months post-stroke. The frequency of NIHSS <7 was higher at six months post-stroke.

Table 2. Depression and scores evolution at six months post-stroke

Variable	Initial evaluation	Six months evaluation	p	
Barthel index	<60	9 (11%)	8 (9.8%)	0.5
	61-75	21 (25.6%)	22 (26.8%)	
	>75	52 (63.4%)	52 (63.4%)	
NIHSS <7	16 (19.5)	21 (25.6%)	0.02	
Depression	Without	-	10 (12.2%)	<0.001
	Mild	29 (35.4%)	23 (28%)	
	Moderate	33 (40.2%)	29 (35.4%)	
	Severe	20 (24.4%)	20 (24.4%)	

The severity of depression was not influenced over time by patient’s age, living area, the location of the stroke in the left of right brain hemisphere, in the basal nuclei, temporal, occipital or parietal lobe, or the number of concomitant lesions.

At six months, 10 (47.6%) men were without depression, 5 (8%) men had a milder depression than initially and 1 (3.89%) man presented a worse depression. The severity of the depression did not change in women. The gender related improvement over time was statistically significant (p=0.03).

Patients without a frontal lesion showed an improvement regarding the severity or presence of the depression, as compared with the ones with frontal lesion (p=0.03). Patients without a prefrontal lesion showed an improvement regarding the severity or presence of the depression, as compared with the ones with prefrontal lesion (p=0.02).

There were more females than with frontal lesions (35% vs. 32.3%), or with prefrontal lesions (55% vs. 29%). The

gender and the location of the stroke were interlinked regarding the prediction of the evolution of the post-stroke depression, as we could not determine their independent influence ($p=0.4$).

Discussions

The purpose of the study was to assess the evolution of patients with post-stroke depression and to determine whether or not it was influenced by certain factors such as lesion localization, demographic data, motor deficit, dominant hemisphere. In our study, there was no statistically significant change in baseline and 6-month BDI or GDS depression scores. Graven et al (2016) indicated the persistence of depression 12 months after stroke in 34.8% of cases. Ostir et al (2011) who followed post-stroke depression patients for 12 months noted that one fifth of these patients remained depressed. Ayerbe et al (2011) demonstrated that 55% of the individuals initially identified as depressive remained the same during the following assessments over a 5 year period. Farner et al. 2010 similarly reported the persistence of depressive episodes in 55% of people diagnosed with post-stroke depression and followed for 13 months.

Patients maintained QOL scores to an average of 65 from an initial value of 60, which correlated with the severity of depression in those cases. Oni OD et al. demonstrated that QOL score remained low in patients with post-stroke depression.

In our study, patients with stroke localization other than frontal or prefrontal showed an improvement in symptoms after 6 months. Metoki et al (2016) followed a group of 421 patients at 7 and 10 days using the NIHSS score, stroke imaging and the diagnosis of depression with the Japan Stroke Scale for Depression and demonstrated that 71 patients with stroke in the frontal and temporal lobe developed post-stroke depression. Glodzik-Sobanska et al (2006) followed patients with post-stroke depression at baseline and after 4 months and demonstrated that some patients remained depressive by involving glutamatergic transmission in frontal cortex. Shi et al (2006) assessed patients after 1 year and demonstrated that those with frontal lobe lesions have a two-fold higher risk of persistent post-stroke depression than patients with other stroke locations. In a study conducted by Grajny et al (2016), the authors demonstrated the association between post-stroke depression and stroke location in the prefrontal cortex, but without any follow-up.

In a review of 48 publications, Carson et al (2000) showed that there is no interhemispheric difference in the occurrence and evolution of post-stroke depression. In the study, no statistically significant correlation was found between left or right hemisphere localization and the persistence, worsening or amelioration of post-stroke depression after 6 months.

Gender distribution has shown a predominance of men and a 3:1 male to female ratio. The predominance of post-stroke depression in men was also demonstrated by Camões et al (2011). In our study, men showed a statistically significant improvement in depression compared to women at the six-month examination. The limitations of the study are the small sample size, the lack of a structured interview for the psychiatric diagnosis of post-stroke depression and the poor accessibility at the 6-month examination, especially for patients in rural areas.

Conclusion

There was an improvement in the severity or persistence of post-stroke depression 6 months after ischemic stroke, which was influenced by patient gender and location of lesions. Thus, males and patients with stroke location other than the frontal and prefrontal cortex showed statistically significant improvement of symptomatology.

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