

ANTIOXIDANTS, ADJUNCTIVE MEDICATION IN TREATING CEREBROVASCULAR ACCIDENTS

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Abstract

Even if it represents the third cause of death after heart diseases and various types of neoplasms, the cerebrovascular accident (CVA) is among the leading causes of death and disability that affect both the elderly and the middle-aged or younger population in developed countries. In terms of social costs, the recovery after a stroke ranks first. The current standard therapy in stroke is represented by the allopathic - drug therapy, respectively by the recovery treatment for restoring the quality of life. In this study we have evaluated the effectiveness of the introduction of complementary antioxidants in the recovery of the patient affected by a stroke, welcoming any therapeutical alternative. The research was conducted on a group of 40 patients with stroke divided into two homogenous groups. One group received allopathic drug treatment and the other group received doses of antioxidants in addition to drug treatment. The evaluation was performed according to the standardized scales of documenting neurological deficits. The obtained results showed that the use of antioxidants is indicated as adjunctive therapy in treating stroke.

Key words: cerebrovascular accident, antioxidants, standardized scale for neurological deficits

INTRODUCTION

A stroke involves the sudden interruption of blood supply to a certain region of the brain that leads to permanent damage of the brain. (C. Arseni, 1994 pg. 55 to 56)

There are different ways in which strokes may occur:

- a blood clot derived from elsewhere in the body, usually from the heart, can travel up to a blood vessel in the brain obstructing it and damaging that portion of the brain. This process is called cerebral embolism.

- a blood vessel in the brain may break suddenly resulting in a cerebral haemorrhage.

- cerebral thrombosis, when a blood clot occurs at the level of a blood vessel in the brain blocking it. (H. Marcovici 2004)

Cerebral thrombosis usually occurs more frequently in that segment of the artery where atherosclerosis, respectively arterial stiffness is already showing.

Strokes occur within seconds or minutes, even in a brutal way, and are sometimes called "brain attacks".

Depending on the way strokes manifest themselves, there have been defined two types of strokes:

A. Ischemic stroke - when the oxygen supply in the nerve cells in the respective part of the brain is interrupted due to the obstruction of a blood vessel supplying the brain. Various biochemical processes at cellular and molecular level are responsible for the occurrence of cerebral ischemic lesions. From a therapeutical point of view, we can find clues at each stage as part of the cascade of events that are characteristic to cerebral ischemia and the therapy with neuroprotective agents showed beneficial effects in the preclinical tests run on laboratory animals. (3) Clinically, these cerebrovascular accidents may be:

1. Transient ischemic attack (TIA)
2. Involutive ischemic attack (minor stroke)
3. Lacunar ischemic stroke
4. Evolving ischemic stroke
5. Established ischemic stroke (cerebral infarction)

B. Haemorrhagic stroke—when a blood vessel breaks causing cerebral haemorrhage.

Three periods are highlighted chronologically according to the stage of the pathogenic processes that occur during the acute and late period of the stroke:

1. Early recovery period (up to 6 months after stroke onset);
2. Late recovery period (6-12 months);
3. Chronic / sequelar period (within 1 year after stroke onset).

Several risk factors are **responsible** for the occurrence of cerebrovascular accidents. These risk factors may be **non-modifiable** such as age, race and sex or **modifiable** such as hypertension, smoking, diabetes, dyslipidaemia, diet, obesity, physical inactivity, postmenopausal hormone therapy.

Recent clinical studies suggest the usefulness of several classes of drugs for the recovery of disabilities caused by strokes combined with physiotherapy and occupational approaches (*Popescu C.D. Vol. 4, 2000.*)

The obstruction of a blood vessel is caused by the presence of a thrombus, better said by the existence of platelets that are the main components of the thrombus. The explanation consists in the fact that the lesions in the endothelial surface of the atherosclerotic plaque facilitate the sedimentation of thrombocytes, their activation and the recruitment of new ones, causing the formation of a thrombotic cork due to the sedimentation in this place and leading to the occlusion of the vascular lumen. If it is possible to inhibit certain pathways that activate the mechanisms that platelet

adhesion without causing bleedings, we can help prevent stroke. In this respect, medical treatment must include platelet antiaggregants which make this thing possible by the mechanism of inhibiting cyclooxygenase (COX) that decreases the production of prostaglandin I₂ (PGI₂, prostacyclin) and the production of platelet thromboxane A₂ (TxA₂). (*H. Marcovici pg.33*). The optimal dose to achieve the antiplatelet effect must inhibit the synthesis of TxA₂ (thromboxane A₂) without affecting the synthesis of PGI₂. Modern researches have determined another way of blocking the antiplatelet activity by the selective and irreversible inhibition of the bonding of ADP with its platelet receptors. Drugs that fall in the latter category are the most effective in atherothrombotic disorders. The cerebral ischemic stroke, in the way it attacks the body, leads to the generation of oxygen free radicals. The oxygen free radicals are highly reactive species that can trigger chain reactions that can damage neuronal membranes. (*Harrison D 2003,91; 7A-11A*) To neutralize these free radicals in the body requires the presence of potential neutralizing agents, that is antioxidants (*Abilés J. ,Crit Care. 2006;10(5):R146*) Antioxidants can be taken as complementary treatment in allopathic medicine - without any prejudice to the drug treatment - in the form of nutritional supplements in doses that are determined, verified, standardized and approved by the Ministry of Health.

MATERIAL AND METHOD

Study materials consist of medical documents, mainly the medical record of the patients diagnosed with CVA and hospitalized at the Recovery Hospital from Baile Felix-Oradea, Bihor County. Data was collected from patients who were able to speak or from family members. The evolution of patients' disease since their being hospitalized as well as the degrees of dependency present during hospitalization and at externalization were followed step by step.

The study was conducted over a period of 9 months and comprises a total of 52 patients diagnosed with ischemic stroke aged between 60 to 70 years, with symptoms characteristic to stroke. All patients from the group/lot were within the category of the early recovery period, namely up to 6 months after stroke debut. Patients were divided into two study groups, group I, 27 patients who were administered allopathic treatments recommended by the specialized doctor and group II - 25 patients who were administered in addition to allopathic treatment measured doses of antioxidants also. At the entry into the study and at 6 months patient assessment was based on SS-QOL questionnaire (Stroke Specific Quality of Life Scale), which comprises three areas:

1. psychical functionality
2. social functionality
3. physical functionality

Each field has several items (2 to 7 items) that contain a different number of questions whose answers are scored from 1 to 5, the maximum score meaning a good functionality. The score obtained for each field was interpreted as follows according to the maximum score:

- <25% - very reduced functionality
- 25-50% - reduced functionality
- 50-75% - moderate functionality
- >75% - good functionality.

RESULTS AND DISSCUSION

During the study it has been observed an improvement in the emotional status of the patients who have become less vulnerable, were able to easily talk about their health problems, becoming more confident in the positive development of their condition. It was also observed an increase in the physical tonus and socialization.

Functions	Without antioxidant				With antioxidant			
	Baseline		At 6 months		Baseline		At 6 months	
	No.	%	No.	%	No.	%	No.	%
Psychical functionality								
Very reduced	1	3,7	1	3,7	1	4,0	1	4,0
Reduced	18	66,7	16	59,3	17	68,0	15	60,0
Moderate	7	25,9	8	29,6	6	24,0	6	24,0
Good	1	3,7	2	7,4	1	4,0	3	12,0
Social functionality								
Very reduced	5	18,5	4	14,8	6	24,0	5	20,0
Reduced	17	63,0	16	59,3	14	56,0	13	52,0
Moderate	5	18,5	6	22,2	4	16,0	5	20,0
Good	0	0,0	1	3,7	1	4,0	2	8,0
Physical functionality								
Very reduced	1	3,7	0	0,0	1	4,0	0	0,0
Reduced	12	44,4	11	40,7	12	48,0	10	40,0
Moderate	14	51,9	14	51,9	12	48,0	12	48,0
Good	0	0,0	2	7,4	0	0,0	3	12,0

In the psychic and social field, most patients which initially had reduced functionality (66.7% versus 68.0%, respectively 63.0% versus 56.0%) and in the physical field the functionality was reduced or moderate (44, 4% and 51.9% versus 48.0% and 48.0%).

After 6 months, the improvement of the mental functioning occurred in 3 cases of the group without antioxidants (11.1%) and 4 cases of the group receiving also the antioxidants (16.0%) (p = 0.181).

The improvement of the social functionality was recorded in 4 cases of the group without antioxidants (14.8%) and 5 cases of the group receiving also the antioxidants (20.0%) (p = 0.194).

The administration of antioxidants has led to the increase of the physical functionality to a higher percentage than in the group with exclusive allopathic therapy (24.0% versus 18.5%) (p = 0.198).

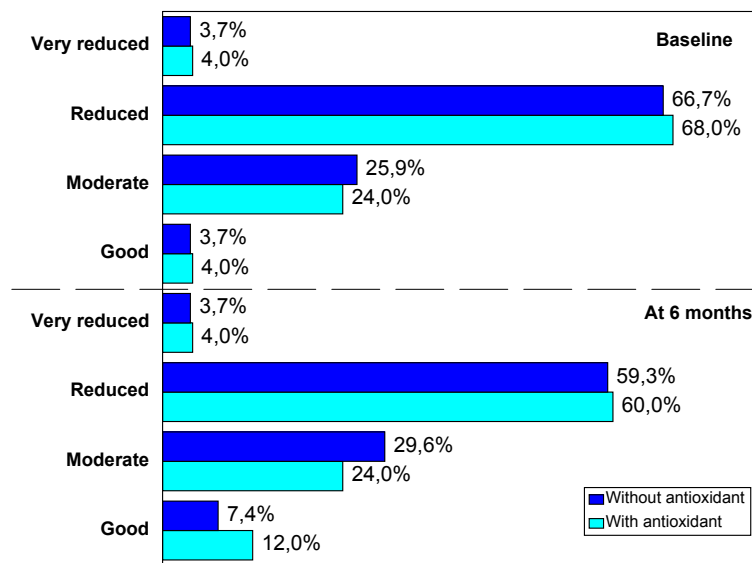


Figure I The change of the psychological symptoms

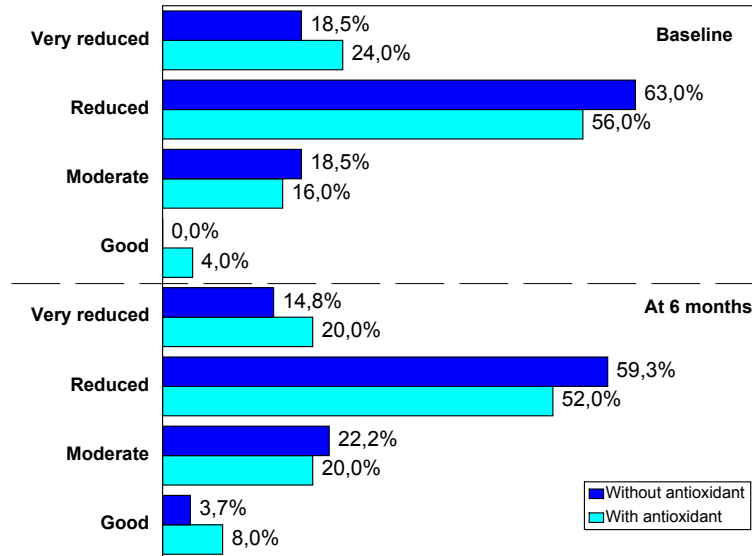


Figure II The change of the social functionality symptoms

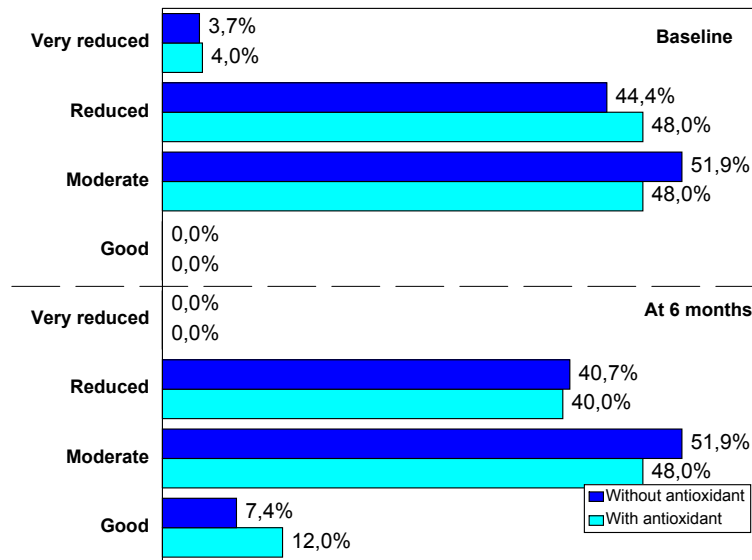


Figure III. The change of the physical functionality symptoms

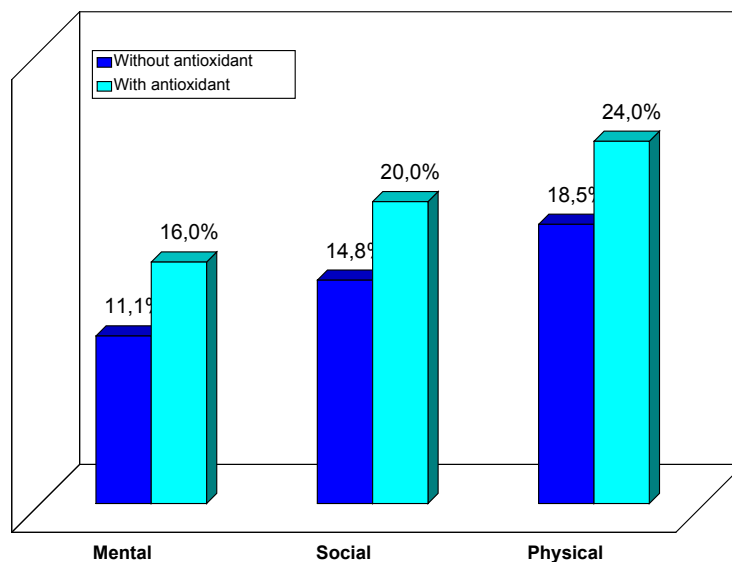


Fig.4. The improvement of the functionality on fields

CONCLUSIONS

The statistical analysis of the data shows that the allopathic treatment completed with antioxidants determine an important improvement of the symptoms that are specific to a stroke and, consequently, of the quality of patients' life.

Results show that the administration of nutritive supplements with antioxidants together with the allopathic treatment may represent a therapeutical alternative in treating patients who have suffered of a stroke.

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7. Stroke Specific Quality of Life Scale

8.A. MACNEW– Mac Master-Newcastle Heart-related Quality of Life Questionnaire (chestionarul Mac Master-Newcastle pentru calitatea vieții pacienților cu bolicardiovasculare, autor Neil R. Oldridge, 1998, și versiunea românească, Oldridge, et al., 2003